Electrical Review

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View in Interior of Universal Electrical Co.'s Store, Columbus, O., Showing the Modern Method of Displaying Only One or Two Appliances in the Demonstrating Room.

Marketing Washers and Vacuum Cleaners in the Home

Problem of Merchandising Electrical Household Labor-Saving Appliances Easier Today Because of Judicious Advertising, but Skillful Salesmanship Is Still Necessary to Success

By E. L. BENNETT

Sales Manager, The Air-Way Co.

At a recent electrical convention an officer of a large corporation made the statement that he wanted to impress upon the minds of all those engaged in the sale of appliances that the greatest possibilities for the next few years are in the sale of electric cleaners and washing machines. He substantiated his statement by saying that housewives are becoming thoroughly educated to the utility of these devices, which provide the most efficient methods of accomplishing the work formerly done in a crude and laborious way.

A numer of years ago I encountered an old-time house-to-house salesman trying to interest women in the purchase of an electric vacuum cleaner. In those days selling a vacuum cleaner or a washing machine to the housewife was perhaps comparable today with trying to interest a business man in the purchase of a commercial aeroplane for his everyday use. He, the business man, could comprehend that no doubt the near future would provide a much faster mode of travel—the aeroplane—but to him it was only a vague idea. Yet he believed it was the coming thing.

So did the housewife believe that to save labor in her home some day she had to have an electric vacuum cleaner, an electric washing machine, an ironing machine, etc. Seemingly the price was prohibitive. In fact, like most

all purchases of that kind, she figured first cost, not having been educated to the theory that such an appliance to cost, say $75 or $100, should be spread over a term of years.

Modern Housewife Ready for Developments in Appliances.

Today, thanks to many excellent machines, intelligent engineers and unselfish capital, we meet a different condition. The housekeeper does not need to dress like a nurse tending a contagious disease case in order to do the cleaning with old-fashioned broom and dust-pan or brush and beat and pound a rug in the back yard. Instead, we have many creditable electric suction cleaners for such purposes. In the past three years the home manager has had the privilege to reviewing a number of striking developments toward the solution of the house-cleaning problem.

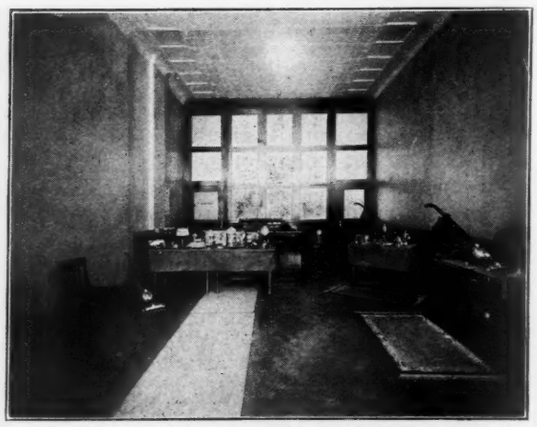
Today the good housewife does not think with dread of cleaning. Instead, her cleaner is easily connected to the electricity supply and is accessible. In a moment she simply runs her machine over the rugs, carpets and upholstered furniture, thereby saving not only time but wear and tear on material as well as wear and tear on the body and mind.

The dealers of today who sell labor-saving appliances fortunately have connected with the way of twentieth century merchandising plans, some of which are being developed by the manufacturers. However, many of our most ingenious sales plans have been defined by the men on the firing line—the salesman or house-to-house canvasser. Thanks to publicity, we may take almost any magazine and find striking advertisements forcibly telling the housewife of the many ways to save labor in her home.

Combining Vacuum Cleaner Sales With Phonographs.

It was my privilege not long ago to call on a distributor in the Middle West and witness a most interesting demonstration and sale of a vacuum cleaner in connection with the sale of a phonograph.

The salesman argued that the phonograph was as necessary in the home as the cleaner; it performed a function necessary to the enjoyment of the family. Yet he most forcibly pictured to the housewife the labor and money she would save by having her home thoroughly sanitary and satisfactorily cleaned by the cleaner. The saving, as compared to sending her rugs out and having them cleaned by a process, would not only pay for the vacuum cleaner in time but would afford additional money to pay for the phonograph. As the result of the salesman's forcible arguments the lady of the house purchased not only the phonograph but the cleaner.



Small Appliances and Cleaners Displayed Near Desk Where Lighting Bills Are Paid.

In drawing this bit of psychology in salesmanship to the attention of Electrical Review readers it will afford some thought on the part of men who have purchased some new piece of furniture or some other appliance for their home. Women today are managing their homes as husbands manage their business—along scientific, mechanical lines—and we are not sure but that the housewife is doing a better job managing her home than some business men in their attempts at managing a business.

Dealer Demonstrates Electrical Appliances to Sewing Circle.

We have in mind now a plan which was put in effect by a dealer to have his electric shop associated in the minds of his community as a house of service. Nothing was seemingly too laborious for him or his organization to do with regard to information and service to anyone. This dealer could well be nicknamed a "Go-Getter." He launched the idea by putting in six electric sewing machines, nicely arranged on sewing tables, and then sent special invitations to the ladies' aid society of one of his local churches, stating that they were at liberty to visit his store on a certain date and to bring their sewing, which all churches do more or less for missions. He further stated that at noon-time he was going to extend to them a buffet lunch. He took particular pains to arrange his store attractively with the articles displayed in such a manner that each of the ladies present might actually make their own demonstrations to ascertain the operation of the various articles.

For instance, in the center of the room was a rug, 10 by 12 ft., and at either end were two types of vacuum cleaners. The coffee that was served at luncheon was made in an electric percolator, the ices served were made in an electric refrigerator outfit, and a very tempting dish was prepared in an electric chafing dish. A report from this dealer states that the advertising derived and the actual sales were gratifying. Each of the ladies will always remember Mr. Dealer as an unselfish one.

In selling, human nature treats with human nature, and we are confronted with an element of two classes: those that are to be pleased and those already pleased. Both are necessary, and the dealer who is unable to ascertain the true meaning of satisfaction is to be pitied.

It isn't necessary at this time in the twentieth century to use the old method of canvassing, which was, after approaching the housewife on the front porch, to hold her attention, even if it were necesasry to push the foot in the front door so it could not be closed. Instead, thanks to suggestions, the dealer today operates his campaigns

for reaching the housewife in such an intelligent and enlightening manner that she cannot help but be greatly interested.

There are many elements needed by a successful canvasser and the first requisites are cleanliness, appearance and ability to state quite forcibly a straightforward story; to be absolutely sold himself on his proposition and to know the personnel of his company in every instance. He should know just how far he may go with regard to promising service and to never promise anything to the housewife that he cannot give. There are some dealers today who, in order to make sales, will promise anything and give nothing.

Care of Window Displays and Newspaper Advertising.

Much thought should be given by the electrical contractor-dealer in these days to his window dressing. We are all prone to "Stop, Look and Listen," especially in the windows of any store that is attractively arranged, no matter what they contain. A first-class window is the best advertisement and seller that can be had and it is necessary that it be kept clean and the windows washed regularly. The psychological effect of a clean window upon a passer-by may be compared to that produced by a man with a clean collar and a smooth-shaven face—it creates sales impressions and confidence. Many, many times are unfavorable remarks made about store windows that are dirty.

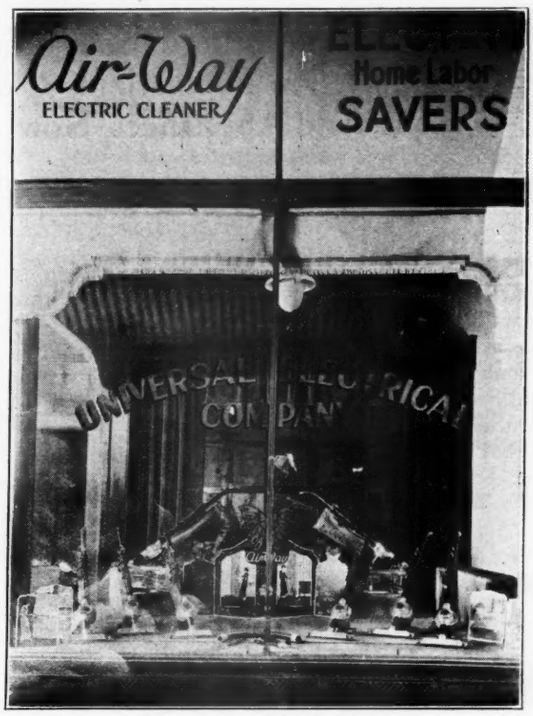
If the electrical dealer would engage a professional window trimmer in his city he could lay before him tentative plans for window trimming during a given period of time, say, for instance, 12 months. Very often this window trimmer would be able to suggest attractive background designs that are inexpensive. By having at least four different backgrounds they could be used alternately during the year. They would give variety to the window displays, and at no great amount of expense.

It is further highly desirable for the dealer to work out a schedule of newspaper advertising and window trims to appear co-ordinately. By this plan many dealers are successful in marketing products that the average customer does not know are for sale.

Advice and Training Necessary for Appliance Salesmen.

Many salesmen think only in terms of how much commission they are going to receive, and they will not put their thoughts toward constructive selling. In other words, a quick analysis of prospective purchasers and the determination to sell are necessary. Salesmen of these times are born and not satisfactorily taught. It is practically impossible to take any man of the average type, unless he is interested more or less in selling, and materialize him into what is termed a "salesman." As a matter of fact, the definition of a real salesman is simple, but, to have the true meaning, the word "man" should come before sales, because, after all, it takes a man in more ways than one to be a true salesman. If he be a man first, he can acquire sales ability afterward. A good many of us, we assume, could hitch the word "sales" to our man and have a true condition because we are quite likely to sail over matters that are seemingly trivial.

Many manufacturers maintain "Dealer's Promotion Departments," the aim of which is to



Window Display of Universal Electrical Co., Columbus, O.

thoroughly train each salesman, not only on the product but on household labor-saving devices in general. This is not only commendable but constructive to those presenting sales to the housewife. By this means the ultimate user is going to get first-hand information without any frills or flounces in the way of flowery conversations regarding electric labor-saving appliances for the home. The housewife always wants facts about the new "machinery" she is going to work with, and the modern salesmen are able to dispense these facts in the most convincing manner.

LARGEST CIRCUIT-BREAKERS TO BE INSTALLED AT HELLGATE.

The heaviest circuit-breakers ever designed for 13,200-volt service will be installed by the United Electric Light & Power Co., New York City, in its Hellgate station. There will be 120 of these solenoid-operated type "O4" Westinghouse circuit-breakers having an interrupting ability of 58,000 amperes at the arc (1,500,000 kv-a.). The disconnecting switches are gang operated and their operating mechanisms are interlocked with the oil-breaker mechanism so that the disconnects can not be moved unless the breaker is not in operating position, thus assuring safety to operators.

These oil breakers are unique in that the phase elements will be in separate rooms approximately 30 ft. apart, with the operating mechanism on the floor above, thereby preventing the possibility of a bus-bar short-circuit and minimizing the effects of a ground.

Dishwashing Machines and Their Sales Possibilities

Creating a Market Through Educational Publicity Similar to that Employed in Popularizing Clothes Washers, Flatirons and Other Household Appliances Now Enjoying Large Popular Demand

By CHARLES H. BAY
Detroit Edison Co., Detroit.

Electrical dealers of today are following the path of least resistance. They are selling those products that have been standardized and popularized through liberal advertising and educational sales propaganda. While central stations and manufacturers have been doing a great deal toward promoting the idea of "lightening the labor of the home" through the use of electricity, nevertheless much remains to be done to relieve the housewife of drudgery.

Just where do we stand today? Let us sum up the different tasks of the home. Probably the most irksome ones are washing clothes and dishes, ironing, sweeping, cooking, and sewing. The shortage of domestic help and the high cost of such labor, coupled with the many new demands on the time of the housewife, have made it possible for dealers selling electrical labor-saving devices to do a good business. However, we must realize that this condition cannot last indefinitely.

We can hardly expect to go on increasing our individual businesses at the same rate of increase which has been shown during the past few years. We must in the future look to new fields. There are certain devices which in the past have not received much attention because of the fact that every dealer has been busy retailing the appliances which are the easiest to sell and for which a big demand already existed.

For example, in selling an electric washing machine it is not necessary to sell the customer the idea of washing clothes the electric way, but it is largely a matter of convincing her of the merits of the particular machine under consideration. The same is true of the vacuum cleaner, flatiron, and the many other well-known devices which central-station companies and dealers are selling in large quantities.

Sales Possibilities of Electric Dishwashers and Other Devices Overlooked.

Electrical dealers have been so busy selling these machines that there has been a tendency to overlook the sales possibilities of such articles as the electric dishwashing machines, refrigerators, clothes dryers, water heaters, etc. In the next few years it is hardly to be expected that very many of these devices will be sold in the homes unless we all take an active interest in their development.

Ask any electrical dealer today what he thinks of the dishwashing machine or the refrigerating machine or other devices of that nature, and he will say, "There is a wonderful future for these appliances." But ask him what he is doing to help promote the development and he will tell you that he is too busy selling nationally advertised products to bother with pioneering lines.

Advertising costs money and in order to introduce a new article extensive educational publicity is necessary. Unquestionably, it is a very expensive and difficult task to introduce an appliance for which there is no existing demand, regardless of the merit of that appliance.

Educational Publicity Necessary to Introduce New Appliances.

For years we struggled to introduce and sell those devices which are now being sold so easily. Many dealers of Detroit who are now selling from 100 to 200 washing machines a month can recall the days when the sale of one washing machine was the startling event of the week! Central-station companies can look back to the time when it was necessary to sell flatirons at cost in order to introduce them. In some cases it was difficult to give a flatiron to the customer. These are exactly the conditions which we now face in developing the newer devices mentioned.

We knew that the electric flatiron and washing machine had merit, and we knew that in order to place them on our lines it was only necessary to advertise these merits and to introduce them in the homes where we were sure they would work out their own salvation. Before a central-station company or an electrical dealer begins to promote the sale of any new device he should be absolutely sure that the device has merit. Unless it is the kind of an appliance that will give satisfaction and one which the users will recommend to their friends it would be business suicide to attempt to promote its development. In order to succeed and to make profits we must do constructive selling, and in order to do constructive selling we must sell appliances that give thorough satisfaction to the user. It seems to me that the dishwashing machine presents unlimited marketing possibilities for the future.

Of all household duties one of the most distasteful is that of washing dishes. It is the task that drives father to the restaurant when mother is away. It takes the joy from the entertainment of friends at the dinner party. Dishwashing is the meanest job of all housework, and it must be done three times a day, 365 days a year. Isn't it discouraging? Everyone who has done this work has felt that way. At least, when you have to walk right up to that detestable dishpan and

stay right on the job until the mussy work is done. We all agree that if we could furnish to each of our thousands of customers at a reasonable price a machine that would wash their dishes and dry them without any great fuss or bother it would be a wonderful seller. Every household would be a prospect because every household must wash its own dishes. The small family will raise the objection that they don't use enough dishes at each meal to warrant the purchase of a dishwasher, but what is to prevent them from saving their breakfast and luncheon dishes and washing them with their dinner dishes? They save up their clothes for a week, why not their dishes for a day? They can send out their laundry, they can send out their ironing, but the dishes must be done at home. The job has to be done right in their own kitchen.

Occasionally we find a woman who doesn't mind washing, and often we find the woman who likes to iron, especially the electric way, but seldom do you find the woman who really cares to wash dishes because it means keeping her hands in hot water for a half hour, three times a day. Surely this is the meanest job in all housework.

Elimination of Poorly Constructed Devices Necessary.

Many efforts have been made to perfect a really practical dishwasher, one that is simple to install, operate and care for, and that is thorough, sanitary and quick in its work. Our company has been making investigations and we find that there are certain types of dishwashing machines on the market today that really do the work. We also find that some of them are clumsy, undesirable appliances which are a positive menace to the dishwashing machine business; but this is to be expected.

All of us can remember some of the earlier type of washing machines with their undesirable features. We also remember the flatirons that would hardly last during one ironing. These have all been eliminated and improved devices have taken their places. It can hardly be said that this was a natural development. It was due to the pressure brought to bear by the suggestions and advice of central-station men and electrical dealers. The same will be true in the development of the dishwasher.

To be really successful, such a machine must be capable of not only thoroughly washing all the dishes and silverware, but it must also provide for drying them. To do all this with a minimum of labor the dishwasher must be permanently connected to the hot water supply and drain; otherwise it is necessary to carry water in a pail to and from the machine several times for a single batch of dishes.

At the present time there are two or three really successful types of dishwashing machines on the market. These machines have been tested and approved by the Good Housekeeping Institute, and are being recommended in the editorials of leading magazines. Their manufacturers are being flooded with orders. I have in mind one particular company which received lucrative offers from two or three of our largest electrical manufacturers for the controlling interest of their stock. Naturally, after years of experimentation and development they are loath to part with the product of their life's work. On the other hand, because of their limited resources, they are unable to expand extensively and the growth of their business is entirely due to the merit of this product.

This is a natural healthy growth and we can imagine how successful they will be when their volume of business becomes sufficient and their profits large enough to permit them and their dealers to do the amount of advertising which has been done in the washing machine business.

This is truly a wonderful virgin field. The day is soon coming when a dishwashing machine will be as indispensable in the home as an electric flatiron. We did the things possible to introduce the toaster, percolator and the other popular appliances. We exploited the development of the washing machine and the vacuum cleaner. We carried stock, displayed samples and advertised when the business did not warrant it, and today we are reaping the harvest. Thousands and thousands of small motors and miscellaneous heating appliances have been added to our day load which have filled in the valley and helped make our business profitable. The same reward will and shall be ours if we do our share to awake the sleeping giant of the dishwashing business.

Every central-station office should display at least one dishwashing machine on its floor. In this way the prospective customer is given an opportunity to see what has been done in the field. Our sales people should be instructed as to the merits and talking points of this machine. They should be sold on liberal terms and should be put in the homes on trial; in fact, everything should be done to put the first few machines in service. If we are careful in our selection of the machines which we promote, if we prove to ourselves and our sales people that the dishwashing machine really has merit, if we give to this appliance the attention that it deserves, we shall be repaid for our efforts just as we have been repaid for the time, attention and money expended in developing the flatiron and the electric washing machine.

Some Other Devices That Should Be Popularized.

Then there are the other devices which I have mentioned: the electric refrigerating machine, the electric water heater and the electric clothes dryer. While there is no doubt in my mind that the dishwashing machine is going to be the best seller in the future, it is highly desirable that at least the large central stations should help develop and introduce all of these new appliances. We know that this development is bound to come and it can be hastened by a concerted and constructive effort.

The electric refrigerating machines which are being manufactured today are quite expensive to install and require considerable attention. When the ordinary customer is told that it will cost from $425 to $600 to install a refrigerating machine in their ice box it makes them dizzy for the moment and they usually say, "I will have to give this considerable thought before making up my mind." Of course, it isn't any more unreasonable for them to pay this price for a machine

which will be a source of everlasting comfort than it is to pay $500 or $600 for a piano or $2000 for an automobile. No doubt, if the refrigerating machine gains the popularity which it deserves, the merits rather than the price will be the primary consideration.

The electric water heater is sure to be very popular in the home. We have something like 2000 electric ranges on our lines at the present time, and only about 0.1% of these customers have installed water heaters. We know that the most expensive operation that can be performed electrically is heating water, and we also know that there are only so many heat units in each kilowatt-hour of electricity and, as this remains constant, there can be no electrical device invented which will heat water at a cheaper rate than it is being done at the present time. However, it is only reasonable to expect that the suburbanite of the large city or the customers living in the small town who are unable to get gas service will have their comforts irrespective of cost. We find that where the tank is properly lagged the installation is successful and where the tank is not lagged the customer usually goes broke paying the electric bills. Central-station companies in promoting this branch of the business should instruct their sales people to sell water heaters with the understanding that the tank must be lagged properly before service will be given.

The electric clothes dryer is the missing link between the washing machine and the ironing machine. It is no small task to dry the clothes after they have been washed, and during certain seasons of the year it is necessary for the housewife to use the attic or the grimy basement for this purpose. With the development of a machine that will dry the clothes so that they can be immediately ironed we shall have an appliance that will sell as rapidly as the clothes washing machine of today. One manufacturer has recently put on the market an electric centrifugal device at a reasonable price and with which the clothes can be dried very quickly by merely the turn of a switch. Thousands of customers in the large cities using washing machines will be our future customers for such drying machines. Within a few years there will be as many of these machines sold as there are ironing machines being sold at the present time.

As central-station people and electrical dealers, we owe our united support to the development of all these new devices and our efforts in the immediate future to the popularizing of the dish-washing machine.

AMERICAN FIRM OPENS BRANCH OFFICE AT SINGAPORE.

Arrangements have been practically completed by the International Western Electric Co., according to an announcement by Vice-President G. E. Pingree, for the opening of a branch office at Singapore in the Malay Peninsula. The new office will handle the trade of the Straits Settlement, the Federated Malay States, Borneo, Siam, Ceylon, Burma and the Dutch East Indies. An American Chamber of Commerce was recently opened in Singapore.

Say it Electrically
Select Beautiful Practical and Lasting Gifts
Say Merry Xmas Electrically
Thrift is Common Sense Applied to Spending
Say Merry Xmas Electrically

"Say Merry Christmas Electrically"

Preparatory to launching its 1920 holiday campaign for the sale of electrical goods, the Society for Electrical Development is supplying the electrical industry, including contractor-dealer members, jobbers, manufacturers, central-station companies and all others who retail electrical appliances and supplies, a handsomely designed poster and a cutout stand for window displays, The window piece, in five sections, is lithographed in five colors and accompanied by fully illustrated instructions for adapting it to any size or shape of window. This cutout stand will be the centerpiece in the Christmas window displays of electrical stores. The posters and other advertising matter furnished by the society will carry the same design. Every cutout and poster, as well as other advertising, will carry the slogan, "Say Merry Christmas Electrically." It is planned to enlist every interest in the electrical industry in this campaign.

Sales Developments in Electrical Appliance Field

Shortage of Household Servants, Rather than Scientific Merchandising, Is Held to Be Responsible for Growth of Electric Appliance Industry in United States During Past Five Years

Men who are interested in the electrical industry consider its development during the past 25 years as being phenomenal. When one stops to consider, however, he is impressed by the fact that this development has been largely one of invention and technical perfection rather than that of popularization and distribution. During the past few years it has come to be realized that the applications for the use of electricity have not kept pace with the technique of the industry, and it is safe to assume that during the next decade the development of the industry will be in the nature of invention and sales promotion for the benefit of the consumer.

Electrical appliances have been developed and perfected, but their use in industry and in the home is far from universal. In seeking for an explanation for the present limited use of household electrical devices, one concludes that the reason is attributable to the fact that merchandising methods for them have not advanced with those of merchandising in general industries. It is no exaggeration to say that, had the principles of scientific merchandising and distribution been studied as thoroughly as the laws of physics and mechanics, the use of household and electric devices would be much more universal than it is at present. The present popularity of the household electrical appliances can be attributed rather to shortage in household help than to any method of scientific merchandising. The high price and shortage of fuels also has been responsible for a large increase in the sale of devices, particularly electric ranges.

Early Efforts to Popularize Electrical Appliances.

The efforts of the central-station companies previous to 1915 toward popularizing household electric devices were sporadic and consisted of local campaigns for the sale of flatirons principally. It should be observed, however, that these campaigns were conducted for the purpose of creating a market for electricity and not particularly for the profit resulting from sales of devices. The central-station companies were interested in selling electricity, and the sale of a household electric appliance was simply a means to an end for increasing the energy demand. It is generally known, moreover, that the central-station companies in the majority of cases made no profit from the sale of these devices and often distributed them at a loss, if viewed from a standpoint of merchandise profit or loss. These efforts have resulted in making household electrical devices popular, so that with the recent shortage of domestic help households are adopting these appliances of their own volition because of the previous campaigns of education conducted by the central-station companies.

The fact that the use of household devices is a matter of demand on the part of customers rather than of the persuasion on the part of manufacturers has resulted in the sales attaining tremendous proportions. What they would amount to were a scientific system of merchandising and distribution placed in effect is beyond comprehension. The number of electrically operated household appliances now in operation shows more clearly than anything else their popularity once house owners become acquainted with them or accustomed to using them.

Recent Rapid Developments of Appliance Business.

As indicating the rate of development of the household appliance business as a whole it is interesting to consider the approximate figures for the past few years on heating devices, vacuum cleaners and washing machines. According to the statistics, heating device sales have been approximately as follows:

1909—$ 1,500,000.
1914— 3,500,000.
1917— 7,000,000.
1918— 10,000,000.
1919— 18,000,000.
1920—Running at a rate of from $25,000,000 to $30,000,000, the rate for the year having been checked decidedly up to the present time by lack of production facilities.

In the heating device field, the largest single item has been, and still is, the flatiron, the estimated output for this year being 2,500,000 total, with a list price value of $17,500,000, equal to the whole business of the General Electric Co. in the year 1897.

The record for vacuum cleaners is approximately as follows:

1914—$ 1,300,000.
1918— 11,000,000.
1919— 20,000,000.
1920—Estimated at from $30,000,000 to $40,000,000.

For washing machines the totals are:

1909—Approximately $ 225,000.
1914— " 1,000,000.
1918— " 25,000,000.
1919— " 50,000,000.
1920—Estimated at from $75,000,000 to $100,000,000, representing sale of 700,000 machines.

These figures for household appliances generally are already assuming decidedly important dimensions. Still it appears to those who are most closely following and studying this branch of the electrical industry that only the founda-

tions have been laid for what is ultimately possible.

Marked Increase Apparent in Demand for Electric Ranges.

In considering the development of the heating-device business it appears that while the smaller devices, particularly the flatiron, have been the dominant factor in total volume, a marked increase in the electric range business is apparent. During the past winter the General Electric Co. made an estimate of the development of the electric range business. In making this estimate information was obtained from the principal manufacturers of electric ranges, from the National Electric Light Association, the Society of Electrical Development and from other reliable sources including central-station operators. The total estimate of range sales by all manufacturers, which follow, are about one-half the average estimated by the sources that were canvassed:

1919— 25,000 to 30,000.
1920— 50,000.
1921— 75,000.
1922—100,000.
1923—130,000 to 150,000.
1924—175,000 to 200,000.

The latter figure, which does not take into consideration any export demand, would represent an annual sales volume for electric ranges alone amounting to more than $25,000,000.

Demand for electric ranges has been stimulated by the fact that a great many central-station companies have made special cooking rates. There are some 3500 communities in this country in which low rates for energy have been established for electric ranges and other utilities, such as flatirons, percolators, etc. Not only has the electric range made steady gains in competition with gas in the electric central-station communities where special cooking rates are established, but there is a large field for the electric range in communities electrically served but without gas service. The experience of the last few years on account of coal shortages has given a marked impetus to the demand for electric ranges and the increasing difficulty of the servant problem seems to be a factor more favorable to the electric range than to the gas range.

Merchandising Presents Present Greatest Problem.

It is also interesting to note that the figure of 1919 estimated above was approximately correct, naturally so because the estimate was made near the end of the year. The 1920 figure apparently is small and, in spite of the difficulty in obtaining materials, interference in transportation, plus the present fear that consumer demand will be checked in many lines, the electric range sales for this year will probably reach a total of not less than 65,000. The preceding figure has been checked by information received from various sources and is approximately correct. It is, if anything, too small. Estimates made by competent business men within and without the industry indicate that the demand for household appliances will continue even though there is general retrenchment in other directions.

Manufacturers now are interested more in distribution problems than in problems of development. Household electric appliances have been perfected to such an extent that they are no longer considered to be luxuries, but on the other hand are known to be economic necessities. The big problem that exists at present is that of placing the devices in the homes. This means increased facilities for manufacturing and distributing and devising some scheme for making quick repairs to the device in use. No machine or piece of apparatus of any kind whatever will operate continuously without needing repairs of some kind. This need is not because of any defect in apparatus, but is the natural consequence of wear and time. Coupled with this, the misuse and abuse that all household equipment gets from being used by unskilled operators will be certain to make repairs necessary to equipment that is structurally perfect.

This phase of keeping the appliances in operating conditions after they are sold is receiving serious consideration at the present time. Some form of service station may be developed to be operated in conjunction with the manufacturer and the retailer and at a reasonable cost for repairs to all current consuming devices to the consumer. This will mean active co-operation between the three interested parties in a sale of merchandise, namely, the central-station, the manufacturer and the retailer.

It is evident that when the plans of distribution are approved, the use of household electric devices will surpass present estimates. The demand at present is equal to the capacity of the manufacturing establishments. When the principles of scientific merchandising are improved, one cannot even estimate what the volume of the business will be.

SPAIN TO HAVE ELECTRICAL INDUSTRIES EXPOSITION.

Barcelona, Spain, is to have an exhibition of electrical appliances in 1924, which will be known as the International Exposition of Electrical Industries and the General Spanish Exposition. The ground alloted by the government for the purposes of the exposition is 270 acres in extent, and if necessary 220 acres will be added, depending on the amount of space asked for by exhibitors. Up to the present time arrangements have been made for the erection of buildings covering a space of 2,200,000 sq. ft., and the architects have finished the plans and begun the erection of the chief pavilions. A feature of the exposition is to be the palace of light, where the most recent inventions from all parts of the world in connection with electric lighting will be shown. Other pavilions are to be devoted to exhibits of electricity propelled implements for agriculture and industry.

A. I. E. E. PROCEEDINGS ISSUED IN BOUND FORM.

The proceedings of the American Institute of Electrical Engineers for the year 1919, consisting of 1776 pages of text and 50 pages of index, bound in two volumes, are now being distributed to the membership.

Stator Windings and Connections for Three-Phase Motors

Methods Used in Determining Coil Pitch in Half-Coil and Whole-Coil Windings—Rules for Connecting Coils in Groups and Assembling Groups in Phases—Delta and Star Types of Connection

By JACOB GINTZ

In a three-phase winding the same principles are followed as in a two-phase winding; that is, the winding when complete will have the same characteristics as if three single-phase windings were placed on the same stator. These windings are displaced by 120 electrical degrees from each other, this being the angle by which the applied electromotive forces in a three-phase circuit are

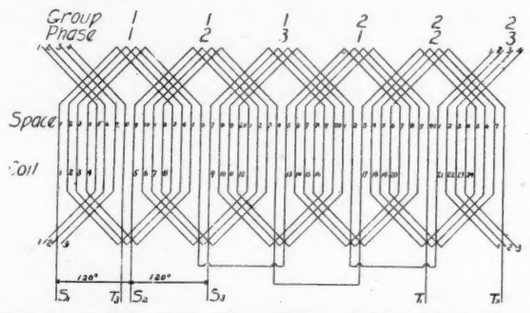


Diagram of Four-Pole, Three-Phase, Half-Coil Induction-Motor Winding.

displaced. When winding a three-phase half-coil stator the coils will be placed in groups and these groups will be displaced by 120 electrical degrees. An accompanying illustration shows a three-phase, half-coil, four-pole winding having 24 coils arranged one coil per slot. The spread of the coils is found by the following formula:

$$\text{Spread} = (C \times 2)/P = (24 \times 2)/4 = 12$$

Then coil No. 1 will be placed between slots 1 and 13. The number of coils per group is found by the following formula:

$$\text{Coils per group} = (C \times 2)/(P \times Ph) = (24 \times 2)/(4 \times 3) = 4$$

To find the number of coil sides to be advanced to equal 120 electrical degrees—bearing in mind that in this winding there is one coil side per slot—it is necessary to proceed as follows: The number of electrical degrees in a four-pole circumference is 180 degrees per pole times 4 poles equals 720 electrical degrees. There are 24 times 2 equals 48 coil sides; then 24 coil sides equal 360 electrical degrees, and 8 coil sides equal 120 elec-

TABLE SHOWING LOCATION OF COILS IN SLOTS FOR HALF-COIL WINDING.

Coil number.	In slots.
1	1 and 13
2	2 and 14
3	3 and 15
4	4 and 16
5	9 and 21
6	10 and 22
7	11 and 23
8	12 and 24
9	17 and 29
10	18 and 30
11	19 and 31
12	20 and 32
13	25 and 37
14	26 and 38
15	27 and 39
16	28 and 40
17	33 and 45
18	34 and 46
19	35 and 47
20	36 and 48
21	41 and 5
22	42 and 6
23	43 and 7
24	44 and 8

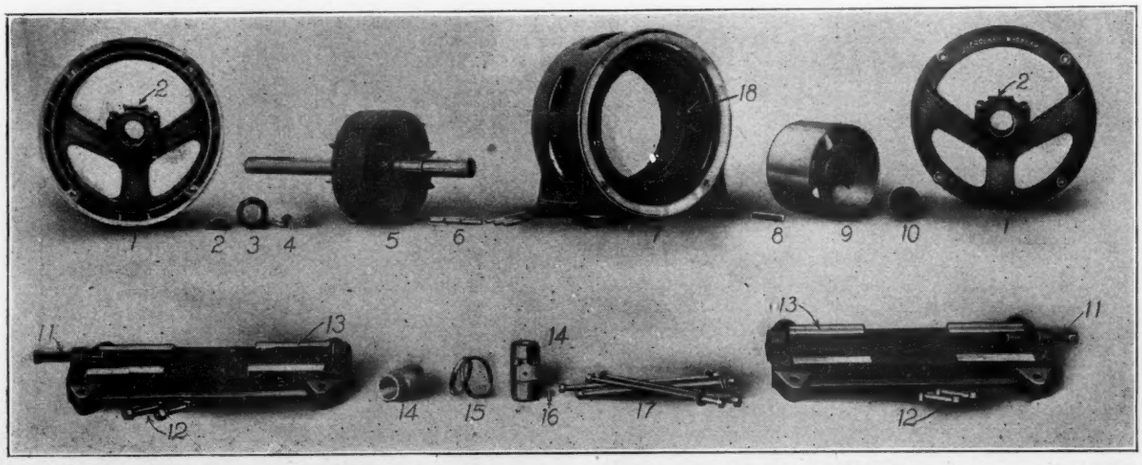


Illustration Showing the Various Parts of an Induction Motor. (1) Shield. (2) Oil-Hole Cover. (3) Inclosing Washer. (4) Oil Gauge. (5) Squirrel Cage Rotor. (6) Terminal Sleeve. (7) Stator. (8) Pulley Key. (9) Pulley. (10) Dust Cap. (11) Adjusting Screw. (12) Foot Bolts. (13) Rails. (14) Journal Box. (15) Oil Rings. (16) Journal-Box Set Screw. (17) Stator Studs. (18) Stator Coils.

trical degrees which will be the distance between the phases and the groups as they are to be placed. The accompanying table will give the numbers of the coils and the slots in which they are placed.

When all 24 of the coils have been placed in groups of four coils each (the groups being 120 electrical degrees apart), all coils belonging to the same group are connected in series. Assuming that group No. 1 is a part of phase No. 1, then group No. 2, which is 120 electrical degrees away, is a part of phase No. 2. Group No. 3, being 120 electrical degrees from group No. 2, will be part

TABLE SHOWING LOCATION OF COILS IN SPACES AND SLOTS FOR WHOLE-COIL WINDING.

Coil number.	In winding space.	In slots.
1	1 and 12	1 and 6
2	3 and 14	2 and 7
3	5 and 16	3 and 8
4	7 and 18	4 and 9
5	9 and 20	5 and 10
6	11 and 22	6 and 11
7	13 and 24	7 and 12
8	15 and 26	8 and 13
9	17 and 28	9 and 14
10	19 and 30	10 and 15
11	21 and 32	11 and 16
12	23 and 34	12 and 17
13	25 and 36	13 and 18
14	27 and 38	14 and 19
15	29 and 40	15 and 20
16	31 and 42	16 and 21
17	33 and 44	17 and 22
18	35 and 46	18 and 23
19	37 and 48	19 and 24
20	39 and 2	20 and 1
21	41 and 4	21 and 2
22	43 and 6	22 and 3
23	45 and 8	23 and 4
24	47 and 10	24 and 5

of phase No. 3. From this it will be seen that groups No. 4, 5 and 6 will belong to phases No. 1, 2 and 3, respectively; then groups No. 1 and 4 form phase No. 1, groups No. 2 and 5 form phase No. 2 and groups No. 3 and 6 form phase No. 3.

By following the rule for the interconnection of groups belonging to the same phase it will be found that there are six terminals, S_1, S_2, S_3, T_1, T_2 and T_3. A three-phase machine can be connected in either of two ways designated as "star" and "delta," the manner of interconnect-

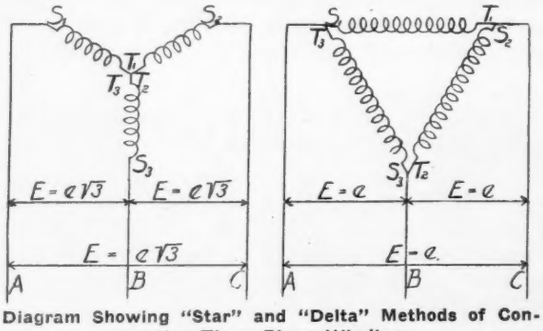


Diagram Showing "Star" and "Delta" Methods of Connecting Three-Phase Windings.

ing the six terminals being shown in an accompanying illustration. Another illustration shows the winding diagram of a three-phase, whole-coil, four-pole winding having 24 coils with 2 coils per slot. In this style of winding it is not necessary to place the coils in groups which will be spaced 120 electrical degrees apart because, when all coils have been placed and paired in groups, such groups as are 120 electrical degrees apart will be connected up as a phase.

To find the spread of a coil in the above connection the following formula is used:

$$\text{Spread} = (C \times 2)/P = (24 \times 2)/4 = 12 \pm 1 = 13 \text{ or } 11.$$

The accompanying table shows the numbers of the coils, the numbers of the winding spaces and the slots into which the coils are wound. When all coils have been placed they are then paired into groups according to the following formula:

$$\text{Coils per group} = (C \times 2)/(P \times Ph \times 2) = (24 \times 2)/(4 \times 3 \times 2) = 2.$$

When coils No. 1 and 2, and the other succeeding pairs of coils, have been connected in

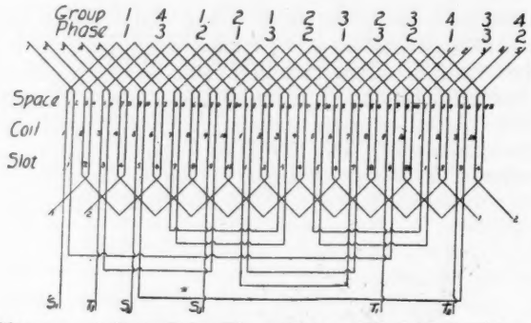


Diagram of Four-Pole, Three-Phase, Whole-Coil Induction-Motor Winding.

series, the winding will result in 12 groups of 2 coils each. Next, the number of coil sides which are equal to 120 electrical degrees is to be determined. As previously explained, each pole is equal to 180 electrical degrees; then four poles will equal 720 and, since 48 coil sides are placed around this distance, 48 coil sides will be equal to 720 electrical degrees and 8 coil sides will be equal to 120 electrical degrees. Then if coil side No. 1 is considered as the beginning (S_1) of of phase No. 1, the eighth coil side away, or No. 9, will be the beginning (S_2) of phase No. 2, etc. By following the rule which gives the connecting methods for interconnecting whole-coil windings the connections shown in the diagram can be readily traced out.

HYDROELECTRIC POWER PLANT FOR PENNSYLVANIA.

The Lancaster-Susquehanna Power Co. is being organized by officials of the Edison Electric Co. and the Conestoga Traction Co., Lancaster, Pa., to carry out the proposed hydroelectric power project in this district, announced in the last issue of ELECTRICAL REVIEW. Application has been made for a state charter. The proposed plant will have an initial capacity of about 100,000 kw., and is estimated to cost $3,000,000; later extensions will bring this sum up to more than double the amount. The new company will not operate in the territory now served by the Harrisburg Light & Power Co., Harrisburg, and the Metropolitan Edison Co., Reading. Those interested in the project include W. H. Griest, president of the Conestoga Traction Co. and the Edison Electric Co.; R. B. Hull and S. R. Zimmerman, Lancaster. George Bullock and E. G. Connette, both of the Pennsylvania Power Co., will also be connected with the new company.

Conducting a Retail Electrical Store for Profit*

Dealers Advised That Store Should Be Located and Arranged to Appeal to Women—Character of Store and Quality of Merchandise Should Radiate Refinement as Well as Invite Confidence

By JOSEPH A. FOWLER

Secretary-Treasurer, Tennessee Association of Electrical Contractors and Dealers.

So much has been said upon this subject during the last three years that it is difficult to know how to approach the matter from a new viewpoint. It is encouraging to know, however, that the question has had so much consideration, and this is true in view of the fact that up until the beginning of the "Goodwin" era very little thought had been given to electrical dealers from a store standpoint.

There are at least five fundamental things which should vitally concern the establishing and conducting of a retail store and these things are applicable to any kind of a merchandising business. They are location, architecture, character, policy and personnel.

If a new store is contemplated, or the moving of the present one is in prospect, the choice of location will have a big influence on the success of the business. We know that four-fifths of our customers will be women so it is important that we make it as convenient as possible for this class of trade to visit our store. The ideal location for the new store would be on the west or north side of the principal shopping street and between department stores, drug stores and specialty shops frequented by such trade. If this choice is not feasible a corner on the next prominent street is desirable. A neighborhood where predominates pool rooms, barber shops, restaurants, metal shops and factories would not invite the attention of the average woman if she could secure her wants in a less objectionable environment. The very reason for the location of the country store at the crossroads applies with equal force to the retail store in the town or city.

Selection and Arrangement of Electrical Store.

The layout of the store, the arrangement of the show window and the design of the front must receive careful study. To begin with, the place should look like a woman's store and as little like a shop as possible. The front ought to be distinctive but not bizarre. If one show window is planned it should be at the right of the entrance door, because people invariably turn and glance to the right. Make the first impression effective. The first ten feet in the depth of your store has a value of 40% of your establishment and should be treated accordingly. The interior should not give the appearance of disorder and this can be avoided if the layout is such as to lend itself to cleanliness, assuming, of course, that it is somebody's job to give the matter first aid. The slowest moving commodities should be located near the front of the store and to the right of the entrance. Rapidly moving staples, such as lamps, flatirons, fuses, etc., should be located toward the rear, to reach which the customer must pass in range of practically all other merchandise. Wiring materials of an unsightly nature should not be conspicuous.

The character of your store should be of the highest sort with somewhat of an atmosphere of refinement. The character of your goods should be no less so. Enough "junk" has been passed out to users of electric ware to retard the growth of any but the electrical business, and the electrical dealer has, in many cases, been just as guilty as the ignorant department and hardware storeman. If your store enjoys the confidence of the buyer it is just as easy to sell an $8 flatiron as one for $5, and a lot more satisfactory. There is a lot more to running a business than the purpose of making money. The worth while merchant of today is concerned primarily with the desire to render a service to humanity in his contact with his customers and employes. Any business grounded on such a principle succeeds, and in so doing incidentally makes money—the greater the service the more money.

It has been said that the first policy of every store should be the attitude that "The customer is always right." Of course, this is a dangerous position to advertise and as a hard and fast rule would prove impractical. As a fundamental theory any business with such a principle as the underlying basis for its general policy could not fail to win the confidence of its constituent trade.

Dealer Ethics and Co-operation.

It is a recognized fact that in this day and time a rose, no matter how beautiful, would blush unseen if its attractions remained unadvertised. Too many rose gardens are cultivated. An advertising campaign should be planned and carried out consistently. From time to time campaigns of one sort or another are indispensable to any business striving to keep its place in the sun. A harmonious relationship with competitors and proper consideration for the rights of others involved in the channel of distribution must not be disregarded. Surely it is good business to cultivate your competitor; to aid and assist him when need arises if for no other reason than that

*From a paper before the Tennessee Electrical Contractors' and Dealers' Association.

of the Golden Rule. Your source of supply commonly known, or ought to be, as your jobber, is as a rule the link between the dealer and manufacturer. He is depended upon to maintain the relationships between all branches of the industry. The good jobber is, or ought to be, the balance wheel of the industry. In times of stress the jobber becomes the banker, and yet who is there among you who has not "fallen for" the siren of the cash house with its 5% saving on specials.

Policy in handling repairs of appliances and maintaining guarantees must be based on a very fair and liberal plane. An earnest effort should be made to repair every appliance brought to the store with the least possible expense as a contribution toward developing confidence in the merit of anything electrical. Maintaining guarantees or promises involves the question of common honesty.

The personnel of your store, office and telephone staff makes for character and policy of the sort we are talking about only if it is selected with the greatest care. Designate the duties of each employe—install in them the spirit of service. Impress upon them the importance of treating your customers in the manner they themselves wish to be treated when they are customers. Such admonitions apply to the employer in double measure because sometimes he needs them more, and he is the example for his employes.

After all, conducting a retail store is a commercial science, a knowledge of which comes from a long but very interesting study in human nature, both our own and the other fellow's.

CUBA AS A MARKET FOR ELECTRIC LIGHTING FIXTURES.

United States Now Has Little Competition to Fear in Meeting Demands of Cubans for Certain Standard and Ornamental Types.

Cuba is an important field for the sale of electrical fixtures because of the increasing use of electricity on the island and of the comparatively slight development of the trade there up to the present, according to the foreign trade bureau of the Guaranty Trust Co. of New York. Moreover, physical and social relations between Cuba and the United States tend to make the latter the natural source of supplies. Before the war the United States furnished more than three-fourths of Cuba's electrical supplies, and during the war furnished all of them. With the elimination of German rivalry, there is now no important competition, and with right methods the United States should continue to control the market for these goods.

The largest cities, including Havana, Cienfuegos, Santiago and Matanzas, are the best fields for the development of electrical trade. Day as well as night service is furnished in them alone. The trade in Havana has been most highly developed and that city is practically the only one where both electrical fixtures and combination gas and electric fixtures are in demand. The other localities have no gas plants and therefore use fixtures designed only for electricity. The various sugar estates have their own electric power plants which furnish electricity for the sugar mills and also for the homes in their vicinities.

In the smaller cities the fixtures used in the illumination of houses and stores commonly consist of drop lights with reflectors. The fixtures should be suitable for high ceilings, and for store use especially, and should be capable of lighting large spaces. In the larger localities some kind of chandelier is generally used, and the most popular is that covered with glass or crystal. The two-arm or four-arm pendant is in common use, with the arms and ceiling rod covered with glass and often different sorts of glass ornaments.

More elaborate fixtures are found in the homes of the well-to-do, and in hotels and clubs. The designs vary widely according to the purchasing power and taste of the buyers. Most are made of crystal or crystal and bronze. Cubans are very fond of the ornate types of fixtures surrounded with ropes of crystal and numerous diamond or pencil-shaped pendants, etc. American designs are said to be suitable for Cuban trade, but our dealers must meet competition in price from the Spanish dealers.

Supply dealers in Havana are selling American domes, indirect and semi-indirect fixtures, and table lamps. There are practically no manufacturers of electrical goods in Cuba, and only a few minor concerns there make chandeliers and drop lights.

Fixtures for store use are very crude in most places, and the buildings are old-fashioned. The merchants on the whole have been conservative about the introduction of modern fixtures. The newer stores, however, are using well-designed fixtures.

Street lighting fixtures should find valuable markets in Cuba as many cities there are installing electric street-lighting systems for the first time. Other cities are bringing their antiquated systems up to date. Havana should be an especially good market, for this municipality is providing electric lights on all streets, 100-watt, gas-filled incandescent lamps being substituted for the arc lamps previously in use.

Electric fans are much used in season. In stores and restaurants the ceiling fan is most used, and because of the high ceilings an extra long pipe must be furnished. Any but the plain type of pipes must be imported. Wall or desk fans of 12 and 16-in. sizes are most common, but the market for 6-in. sizes is growing. American fans are popular and the demand, especially for those not finished in the ordinary black enamel, is increasing.

OPERATION AND CARE OF VEHICLE-TYPE BATTERIES.

Circular No. 92 of the Bureau of Standards, Washington, D. C., has been prepared as a manual for the care and operation of vehicle batteries. Storage batteries are described in detail as to mechanical construction, chemical operation and electrical performance. Curves illustrate the various operating features of both the lead and nickel-iron types of batteries working at different charge and discharge rates.

How Manufacturers Can Increase Jobber Stock Turnover

Appliance Manufacturer Solves Stock Delivery Problem for His Distributors Through Co-operation in Development and Use of Simple, Effective Sales Estimate and Manufacturing Schedule

By W. B. PIERCE

Eastern Sales Manager, Edison Electric Appliance Co.

Last spring when the bankers sounded the signal for business to set its house in order, one of the vulnerable spots was the situation resulting from the large accumulation of unfilled orders which jobbers had placed with manufacturers last year in the wild scramble to cover their requirements in the form of future delivery commitments. It was impossible for any manufacturer to produce and ship the first part of this year those orders which had been originally scheduled by the jobbers to be shipped in this period. Jobbers were anxious to get goods—they had placed their orders in such a manner—and the failure to get the goods as scheduled all tended to produce a rather confused situation.

Another serious weakness in the business structure was the practice developed as an emergency measure under the stress of urgent demand, of placing so-called insurance orders; duplicating or triplicating the original order with other suppliers. From this it is evident that the wholesaler had not arranged for the inflow of material in the well-regulated manner so necessary to sound business and proper turnover. The inflow was not under control.

Development of a Jobbers' Stock and Requirement Survey.

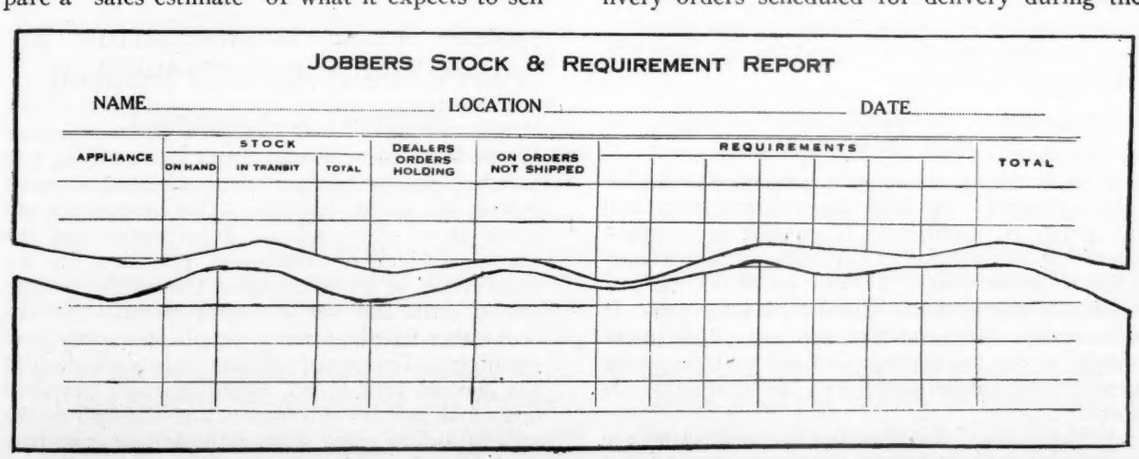
An electrical manufacturer must have a sound basis of procedure for the inflow, production and outflow of this material. Three, four or six months in advance, depending on the market conditions from a purchasing and delivery standpoint, the sales department must definitely prepare a "sales estimate" of what it expects to sell during a certain quarter. This is a detailed schedule by items and catalog numbers.

This sales estimate is taken by the manufacturing department and modified where necessary by manufacturing conditions, and a manufacturing schedule is then prepared. This estimate is used as a basis by the purchasing department in ordering material. Certain items must be anticipated even further in advance, especially in such a market as we have been through. In a normal market the manufacturing turnover should be three or four times a year.

The Edison Electric Appliance Co. uses a production unit of three months, or one-quarter year. Each quarter is laid out in advance, based on a sales estimate. Of course, the estimate is reviewed from month to month and may be modified as conditions develop, but it forms a definite method and basis of procedure. Without this it would be impossible to regulate the business so as to secure the necessary turnover. In proposing a stock and requirement survey to the jobbers, therefore, it was simply suggesting to the jobbers that they adopt a plan which they had found not only successful but quite necessary to a well-regulated operation of business.

Had we been able to make deliveries of accumulated schedules of unfilled orders about June 1—had we been able to make deliveries on these orders with the shipping instructions as they then stood—the jobbers would not have been able to absorb them and would have been embarrassed had we been able to do so.

Not only were there a number of future delivery orders scheduled for delivery during the


JOBBERS STOCK & REQUIREMENT REPORT

NAME_____ LOCATION_____ DATE_____

APPLIANCE	STOCK			DEALERS ORDERS HOLDING	ON ORDERS NOT SHIPPED	REQUIREMENTS							TOTAL
	ON HAND	IN TRANSIT	TOTAL										

Form of Stock and Requirement Report Blank Used Under Sales-Estimate Plan of Co-operation Between Manufacturer and Jobber.

first months of the year, but there was a great accumulation of miscellaneous orders originally placed last year as immediate orders. And had we not been watching our shipments to give maximum distribution we certainly might have loaded up some of our customers so that they would not have been able to get more than one or two turnovers a year even if they had been able to finance their purchases.

On the other hand, a review of the schedules indicated blank periods in which no delivery was planned for by the jobbers and also an unbalanced variety or assortment of goods. Some items were apparently much too high and some much too low. It was a combination of circumstances arising out of trying business conditions that produced this situation. The problem was to remedy matters.

Reviewing and Revising Unfilled Appliance Orders.

Obviously, the thing to do was to ask the jobbers to carefully review all the orders they had on file with us and set down the items, such as flatirons, toasters, percolators, etc., represented by all these unfilled orders. A column was provided for this in the survey chart which we developed. It was also important to know just what goods were in transit. Another column was provided for this. Another column showed the stock on hand, and still another column showed the dealers' orders being held by jobbers. This form is shown on the preceding page.

Then we asked the jobbers to put down in the columns under June, July and August their "sales estimate" by items for each month. Most of our jobbers went a step further and put down their delivery requirements instead of, but based on, their sales estimates. The delivery requirements were obviously the sales estimates modified by stock on hand and in transit, and dealers' orders holding. The jobbers that followed the latter plan authorized us to consider their delivery requirements on the chart as firm shipping instructions on all their orders, superseding all previous shipping instructions. And, on our part, in this way we were able to give them the maximum co-operation.

Many of the jobbers were so well satisfied that they proposed to keep up the quarterly requirement survey for themselves as well as for us, revised monthly, as a sound basis for operation and to so regulate the inflow of material that they will insure a good turnover.

Where Sales Estimate Plan Proves Its Economic Value.

It is certainly a sound, well-regulated plan which provides for both the manufacturer and his group of distributors to operate as a unit—operating on the basis of carefully prepared quarterly sales estimates. It will minimize the lost motion in the physical distribution of goods. It will enable the manufacturer to work more closely to the requirements of his outlets, giving them the maximum benefits of his production efforts.

If the jobbers feel that the manufacturers are working to their particular requirements, and that they can depend on their receiving what they want as needed, they can work to a closer and better schedule and a more rapid turnover.

The ideal way to consider the jobbers in relation to the manufacturer is as a co-operating trade unit—as one big business family. In fact, only in this way can be obtained the best results of mutual success. They have mutual and reciprocal responsibilities. The manufacturer is greatly dependent on his distributing jobber outlets. The jobber really represents the field branches of the manufacturer, and, in a sense, should be considered a part of the manufacturer's organization.

A jobber's prime function is to carry goods in local stock for the service of a group of dealers. Assuming efficient management, his net profits will come largely from his rate of turnover. The more lost motion between him and the manufacturer that is eliminated, the more closely regulated and steady the inflow of his material, the better will be his stock condition and the better his turnover.

To sum it all up, the jobbers are the sales organization of the manufacturers. Or, to put it the other way, the manufacturers are the jobbers' manufacturing department. It is logical that the manufacturer should be interested in the problems and success of the jobber, and one of the most important is the turnover.

MEASUREMENT OF DIFFUSE REFLECTION FACTORS.

The nature of light reflection and the various methods used to measure reflection factors are discussed in Scientific Paper No. 391, recently issued by the Bureau of Standards, Washington, D. C., entitled "The Measurement of Diffuse Reflection Factors, and a New Absolute Reflectometer," by A. H. Taylor. The complete theory and description of a new absolute reflectometer are presented. Thorough tests of the instrument show that it gives correct results. Five absolute methods of determining reflection factors are described, and experimental results with this instrument and two other methods show excellent agreement. The reflection factor of a block of magnesium carbonate was found to be 99%, whereas the previously accepted value was 80%. The reflectometer is portable, and can be used to measure reflection factors of surfaces in situ.

SAFETY FIRST ORGANIZATION ACTIVITIES IN SEPTEMBER.

The activities of the safety organization of the Public Service Co. of Northern Illinois Section of the National Electric Light Association last month comprised intermediate committee meetings in all of the districts. The committees are made up of the heads of departments and the special subject of discussion pertained to the supervision of work engaging the employes connected with the various departments. At the September meetings many details were gone into minutely. The scope of the safety movement has become very broad, engaging many corporations and private enterprises and through publications and in other ways information as to new methods of surmounting hazards is rapidly put into circulation.

EDITORIAL COMMENT

Bankers Realize Needs of Utilities

The months that have just passed have been among the most difficult in the history of many utility enterprises both large and small. With unexpected demands for service, with practically no equipment to be had, with fixed rates and dwindling margins of profit, and with demands for still further reductions in rates, the situation was not what would be considered promising. However, in many cases, temporary relief of some kind was granted, and enterprises were not forced to suspend operations. But the lowering of profits, together with the stringency of regulations, made the borrowing of money almost impossible for many companies.

Recognizing the seriousness of the situation, the National Electric Light Association undertook the task of enlisting aid to bring to light the conditions as they exist. These efforts have already produced results, and the Investment Bankers' Association of America is commencing to take up a portion of the burden formerly carried by the utilities. This association has taken formal action in support of legitimate utility expansion and undoubtedly will continue its efforts until the desired goal has been reached. It has been no small task to convince the bankers that they should lend their influence in support of the utilities, but when fully informed as to operating expenses, need of expansion, and influence of the utilities on the welfare of the country, they lost no time in assuming a share at least of the burden of educating the public to the fact that it is an economic necessity for the utilities to have sufficient working capital. It is to be hoped that other influential organizations will soon see fit to aid the campaign of education.

Business Conditions and Prices Returning to Normal

Newspaper clippings and reports coming from various parts of the country bear evident indications of a gradual return of conditions to normal. These news items present views of the situation from a great variety of angles. Some tell of the slackening of demand for certain products, almost always nonessentials or luxuries; some tell of reorganizations of business enterprises; some tell of settlement of rate litigations, while others give favorable crop reports and other indications of prosperity. Looking at the situation as a whole it appears that the public mind is returning somewhat to a normal state; people are getting over the idea of buying at any price, and are counting the cost and saving.

It is evident that there will not be a food shortage, a clothing shortage or a serious coal shortage during the coming winter. However, there is, and probably will be for some time to come, a housing shortage of no mean proportions. Many homes must be built during the coming year and for several years to come, if the old standards are to be anywhere nearly maintained. The present saving sentiment, commencing to take hold of the public, is responding to this situation and much capital is going into permanent building construction. For one, two, three or more years an increasing amount probably will go into such work, and the electrical industry will be called upon to care for a long list of new customers.

The variety of demands that will be made upon the industry will cover all branches, manufacture, construction, merchandising and service included. No single line will render all the service, and no one will reap all the profits. Handling the business will require the plant and staff of all, and, if cared for in the most economic manner, will require the close organization and co-operation of the entire industry. Satisfaction cannot be given by selling equipment that cannot be served with current, and neither can satisfaction be given by providing current without equipment to use it. Improvement and extensions in plant must be made in harmony with the increased business offered.

If all parties interested will take up the work of informing the public of the great demands now being made on the industry, the public will, to protect its own interests, divide its savings in a manner to allow for the investments required in utility properties. With the needs and demands for service, and the inevitable increased demands of the future, the business outlook of the central station seems assured. The investor will be more than willing; he will be anxious to place his money in such an enterprise. Along with growth of central-station business goes the construction of new lines, wiring of houses, sale of appliances, etc. Believing in your own work and telling your neighbor about the merits of service, about the demand for service, and about the needs of the industry will, in the end, benefit your neighbor, you, and the industry as a whole.

THE WEEK'S NEWS

Reports of Important Meetings, Developments and Other Happenings of the Electrical Industry and Its Allied Interests

ELECTRICITY TO HELP SOLVE RAILROAD PROBLEMS.

Association of Railway Electrical Engineers Holds Convention and Equipment Exhibit in Chicago—Train Lighting Discussed.

The twelfth annual convention of the Association of Railway Electrical Engineers was held at the Auditorium Hotel, Chicago, this week. President L. S. Billau in his address referred to the increasing interest in the association and the important part which the various established railroad associations are taking in the operation of the railroads of this country. The problems to be met with are in a broad sense similar on a majority of the railroads. The standardization of practice and many of the details of equipment can with advantage be largely extended. There are new and serious problems facing the railroads today, he continued, in the solving of which electricity in one or more of its adaptations will play an important part. To meet new duties and increased responsibilities the Association of Railway Electrical Engineers must expand and develop, and as a step in this direction consideration is being given to amalgamation with one of the sections of the American Railway Association.

In its report the committee on illumination recommended the general use of the 50-watt Mazda "C" train-lighting lamp in place of the 50-watt Mazda "B" lamp in view of the increase in illumination and the lower first cost. It was pointed out that on account of the high intrinsic brilliancy of the Mazda "C" lamp it should only be used with deep bowl reflectors or inclosing glassware.

DISCUSS MERCHANDISING OF ELECTRICAL APPLIANCES.

Empire State Gas and Electric Association Elects Officers and Listens to Interesting Papers on Live Subjects.

The question as to whether or not central-station companies should sell electrical appliances was one of the important subjects considered at the sixteenth annual convention of the Empire State Gas and Electric Association, held at Utica, N. Y., Oct. 7-8. H. K. Stein, superintendent of the Genesee Light & Power Co., pointed out in his paper on "Selling in a Small Community" the gains to be made by withdrawing from the merchandising field, maintaining that this was the function of the contractor-dealers and should be left to them. G. I. Vincent, engineer of the Syracuse Lighting Co., discussed the subject from the other viewpoint, stating that he considered a well-developed system whereby the consumers have greater contact with the representatives of the utility companies of value.

Other papers included the following: "Importance of Meter Testing," by F. J. Murmann, superintendent of meters, Westchester Lighting Co.; "Service Charge Rate," by A. Parshall, consulting engineer; "Financing Utility Properties," by R. M. Searle, president of the Rochester Gas & Electric Corp.; "Office Location, Arrangement and Upkeep," by S. J. Magee, vice-president of the Associated Gas & Electric Co.; "Office Work in a Small Company," by Paul B. Murphy, treasurer of the Potsdam Electric Light & Power Co.

The election of officers resulted as follows: President, H. W. Peck, Adirondack Power & Light Co., Schenectady; first vice-president, E. H. Rosenquest, New York City; second vice-president, E. H. Beals, Buffalo; treasurer, W. J. Welsh, Richmond Light & Railroad Co., Stapleton; secretary, C. H. B. Chapin, Grand Central Terminal building, New York City; executive committee, H. L. Mann, Buffalo; E. C. Scobell, Rochester; H. M. Brundage, New York City, and S. J. Magee, Ithaca.

NEW JERSEY GOVERNOR APPOINTS NEW UTILITY BOARD.

Removes Former Members, Charging Favoritism and Discrimination Toward Certain Utilities—Commissioners to Appeal.

Following a series of hearings Governor Edwards of New Jersey tendered official notices to the members of the state board of public utility commissioners, Oct. 14, removing them from office. In his official statement, the outstanding charges are the failure to require the setting aside of adequate depreciation accounts, favoritism and bias toward the Public Service Corp. and its subsidiaries, delay in valuing the property of the Public Service Electric Co. and the Public Service Railway Co., fixing increased retroactive rates for the Public Service Electric Co., establishing seven rates on the lines of the Public Service Railway Co. in one year without sufficient reason, failure to recommend changes in the state utilities law shown to be necessary by experience, permitting diversion of proceeds of bond issues to the account of working capital of certain state utilities, establishing unnecessarily long and extensive processes, retention of experts biased towards corporate interests, and discrimination in granting promptly applications of the public service companies and delaying decisions in other cases.

The removal of the board had been expected and the commissioners are reported to have made plans for a fight on constitutional grounds to re-

gain their positions. The four commissioners removed, the appointees of former Governor Edge, are John W. Slocum, Long Branch, president; George F. Wright, Paterson; Harry L. Knight, Medford, and Andrew Gaul, Jr., Ridgewood.

The new board will be composed of five commissioners, each with compensation of $7,500 a year. The governor has appointed three members of the new board as follows: James A. Hamill, Jersey City, lawyer, former member of the state assembly; Arthur A. Quinn, Perth Amboy, president of the state federation of labor, and former member of state assembly, and Col. Walter E. Whittemore, Newton, engineer, member of the State Highway Commission. The governor has called a special meeting of the Senate to act upon his nominations, and upon the convening of the session will announce the names of the other two members of the board.

JOVIANS TO HOLD ANNUAL CONVENTION IN ST. LOUIS.

Nov. 25-26 has been decided upon as the date of the eighteenth annual convention of the Jovian Order, the sessions to be held at the American Hotel Annex, St. Louis. The convention will consist of business meetings only, with registration the forenoon of the first day. It is anticipated that this meeting will be the most important annual gathering of the order, as the future conduct of the organization is to be definitely decided upon at that time. Jupiter A. J. Binz, Houston, Tex., is expecting large delegations of Jovians from different parts of the country.

ELECTRICAL INSPECTORS MEET IN PHILADELPHIA.

Papers on Timely Subjects and Election of Officers Occupy Busy Two-Day Meeting of National Association.

Changes in the National Electrical Code were presented and discussed from various angles at the joint meeting of the National Association of Electrical Inspectors and the Electrical Conference held Oct. 12-13, at Philadelphia. Considerable interest was evidenced in the changes, particularly as they affect inspection work and as they may be subject to varying interpretation.

Dana Pierce, vice-president of the Underwriters' Laboratories, gave an interesting and instructive talk dealing with the problems of inspection as met by the laboratories. A. R. Small, also of the Underwriters' Laboratories, discussed other features of inspection, dealing particularly with approved devices. "Safety to Life" was the subject of a talk by Dr. M. G. Lloyd of the Bureau of Standards. Life hazards merit consideration, as well as fire hazards, in inspection work.

The National Electric Light Association was represented at the meeting by W. J. Canada, who discussed neutral grounding, rules and various situations where the work of the inspectors and the association meets. The following officers were elected for the ensuing year: President, Washington Devereux, Philadelphia; vice-president, Mortimer B. Gleeson, Philadelphia; secretary, Thomas H. Day, Hartford, Conn.; assistant secretary, Richard J. Forsyth, Greenfield, Mass.; corresponding secretary, A. H. Lilley, philadelphia; treasurer, J. W. Kelly, Camden, N. J., and chairman of the executive committee, J. C. Forsyth, New York City.

TO LAUNCH ORGANIZATION FOR INDUSTRY CO-OPERATION.

Conference Club Dissolved—Outgrowth Will Be New Organization Representing Different Branches of Electrical Field.

The last meeting of the Conference Club was held at White Sulphur Springs, W. Va., on Sept. 30 and Oct. 1-2, the principal matter under consideration being the formulation of plans for an electrical industry conference or forum as presented at the club meeting in New York City last January. Those present expressed themselves intent on securing the industry's adoption of the Conference Club idea, and concluded that progress would be more rapid if the work of the club were continued along somewhat different lines.

The meeting expressed itself as favoring the creation of a committee representative of the entire industry to further the work of organizing a permanent industry conference. It left the matter of creating this committee in the hands of L. K. Comstock, the club president, and then formally withdrew from the field of activity.

In commenting upon this action, one of the members made the following statement: "If the new body, as yet unnamed and without organic substance, ever becomes a reality, it will take its being from no single branch or element of the industry but from the industry as a whole. And that is precisely the manner in which such an organization should come into existence if it is to become in the future the far-seeing instrument for effective industry co-operation which not only the members of the Conference Club but many thinking men in other branches of the industry have been dreaming. The Conference Club has given its life that its faith may live."

SCHEDULE OF MEETINGS FOR PHILADELPHIA SECTION, A. I. S. E. E.

The following papers have been scheduled for the Philadelphia Section, Association of Iron and Steel Electrical Engineers, for the 1920-21 season: Nov. 6, "Electric Heat Treatment—Present Practices and Future Possibilities," by George P. Mills, electrical engineer, Electric Furnace Co., Philadelphia; J. R. Bower, assistant master mechanic, American Car & Foundry Co., Berwick, Pa., and James E. Wilson, superintendent electrical department, Treadwell Engineering Co., Easton, Pa. Dec. 4, "Instruction in the Care, Use and Inspection of Flexible Steel Cables," by H. C. Boynton, metallurgist, and W. Voigtlander, assistant engineer, John A. Roebling's Sons Co., Trenton, N. J. Jan. 8, "Power-Factor Correction and Its Relation to Plant Operation," by P. T. Vanderwaart, electrical en-

gineer, New Jersey Zinc Co. of Pennsylvania, Palmerton, Pa. Feb. 5, "Review of Cost of Rolling Steel in Various Mills," by G. E. Stoltz, engineer in charge, steel mill division of the general engineering department, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. March 5, "Methods Used to Insure Continuity of Service," by E. D. Sibley, Metropolitan Edison Co., Reading, Pa. April 4, "Generation of Power in Steel Mills," by D. M. Petty, superintendent electrical department, Lehigh plant of the Bethlehem Steel Co., Bethlehem, Pa. May 2, "General Ideas and Discussion."

DR. STEINMETZ DISCUSSES CAUSES AND EFFECTS OF LIGHTNING.

Voltages, Currents and Energy of the Stroke Are Assigned Probable Values in a Talk Before Engineering Societies.

The old theory that lightning is a simple spark discharge, like the discharge of a condenser, from the clouds to the earth cannot be made to stand in the face of present-day knowledge of the numerical quantities involved, according to the statements made and the figures given by Dr. Charles P. Steinmetz in his talk in Chicago, Oct. 20, given under the auspices of the Western Society of Engineers and the American Institute of Electrical Engineers. Assuming a cloud one-half mile square floating at a distance of 2000 to 3000 ft. from the earth, it was shown that the voltage to cause a spark discharge from cloud to earth would be beyond all reason. The energy of such a spark, lasting for only a small fraction of a second, would amount to 7,000,000,000 ft-lbs., or to 3000 hp-hrs.

Experience has shown that not to exceed 1% of the lightning discharges take place between clouds and the earth, most discharges being between clouds and within a single cloud. These flashes are often from one to two miles in length and are progressive in nature. That is, they start with the puncturing of a short space, possibly 20 or 30 ft., and spread until the potentials are equalized to a value corresponding to the voltage required to maintain the discharge. The period of time occupied by a discharge is quite short, being estimated at from 0.00001 to possibly 0.25 second for the slower-acting flashes of more uniform potential distribution.

Dr. Steinmetz stated that only a fraction of the lightning disturbances on electric circuits were due to direct strokes, the troubles encountered resulting from induced voltages that have values of possibly 500,000 to 1,000,000. Lightning troubles are noted to increase with the extent of the system, the most troubles being met in systems of such an extent as to require 30,000 to 50,000 volts for transmission. Larger systems using 100,000 volts or more seem to be quite immune from trouble. The cause for this condition was attributed to the fact that insulation of the high-voltage lines was capable of standing the disturbances induced by lightning discharges, these disturbances being effective only for short intervals and being of about the same order of magnitude as the insulator capacities.

The method of accumulating a charge of 50,000,000 volts or possibly twice this value on a cloud was explained as involving an initial charge on small particles of condensed moisture, the initial charge being due to the position of the cloud with respect to the earth. It was explained that the earth was surrounded by an electrostatic field with a gradient outward from the surface. Moisture condensing at a distance of one-half mile from the earth would be in a field at a potential of 100,000 volts to earth and would assume a charge corresponding to this potential. By collecting into larger particles the charge would be accumulated until values of 50,000,000 volts or more would be reached when drops of rain were finally formed. Inequalities of 1 or 2% of this value, between sections of a cloud quite close together, would suffice to cause a local discharge which would result in a redistribution of potentials and probably in an extended flash.

From the effects of direct strokes it has been estimated that the flow of current may be anywhere from 1000 to 100,000 amperes, these estimates being based on the size conductors that have been melted during the discharge of a stroke to ground. The illuminating effect of lightning was used to estimate the quantity of energy involved. The spectrum and efficiency of illuminating sources of similar characteristics being considered, it was shown that the light energy of a flash might be equivalent to 10 hp-hrs. The light efficiency being only about 1%, it is evident that this estimate of total energy corresponds to the one given previously.

Numerous lantern-slide illustrations of lightning flashes were shown and discussed. After the formal talk was completed, Dr. Steinmetz answered questions and discussed heat lightning and special cases observed by himself and others. Dr. Steinmetz gave an interesting talk Thursday noon after the luncheon of the Electric Club of Chicago, using as his subject the coal and hydroelectric resources of the country.

NEW YORK ELECTRICAL LEAGUE RESUMES MEETINGS.

The New York Electrical League resumed its monthly luncheons at the Hotel Astor, New York City, Oct. 13, with an attendance of over 150 members and guests. Alfred W. McCann, food expert of the *New York Globe*, was the principal speaker.

BANKERS' ASSOCIATION ACTS ON UTILITY SITUATION.

Recognizes Need for Co-operation Between Operators, Investors and Regulating Authorities, in Order That Expansion May Be Made.

Urgent need of funds to care for the growing demands for utility service and the greatly increased costs of new construction has brought the banking and utility interests of the country into closer touch with each other during past months than ever before. The National Electric Light Association and others have worked with the banking and investment organizations of the country in an effort to make clear the actual

financial conditions involved in utility development and operation. It seems that the efforts expended have not been entirely in vain, since the board of governors of the Investment Bankers' Association of America has seen fit to take formal action looking toward the easing of the burdens of over-stringent public regulation.

This action has, for the present, taken the form of the following resolution sent to the governors and regulating authorities in various states:

Whereas, sound and constantly expanding public utilities are essential to the welfare and prosperity of the communities served;

Whereas, the conditions resulting from the war have increased the costs of utility operation and of new money required for expansion, and prevented the growth of utility service to meet the increasing requirements of the public and of industry;

Whereas, there is a recognized shortage of electrical power, and it is of vital importance to the industries of the country that means be found for providing additional power supply;

Whereas, the street railway systems are so tied into the business of the nation that their rehabilitation, maintenance and growth must be permitted and provided by the public dependent on their efficient service;

Whereas, the telephone and telegraph have become so important in our daily business and social life that they must extend their service daily to meet the public demands;

Whereas, the diminishing coal resources and the increasing demands on the oil supplies throw additional burdens on the gas industries which can be met only by their expansion;

Therefore be it resolved, that it is the sense of the board of governors of the Investment Bankers' Association of America that there should be co-operation between the investment bankers and the owners and operators of utilities and the regulating officials, in laying before the public full information respecting the vital importance of prompt and continuing expansion of all kinds of utility service, and in encouraging such utility regulation as will provide sound credit as the basis for financing, to the end that the investing public may provide the necessary funds by investment in sound public utility securities;

Be it further resolved, that copies of this resolution be sent to the governors and the regulating authorities of the several states.

ENGINEERS TO STUDY ELECTRICAL INSULATION PROBLEMS.

The National Research Council has entered into an extensive campaign to investigate the principles of insulation, a matter of vital importance to the electrical trade and to its consumers. A meeting of the council's insulation committee was held recently in New York City, F. B. Jewett, chairman of the committee, presiding.

For some time past the National Research Council has been endeavoring to formulate a practical plan whereby co-operation between the universities, the industries and the National Research Council might be accomplished in attacking the problems involved in fundamental research upon insulating materials.

REPRESENTATIVES OF A. I. E. E. ON ENGINEERING COUNCIL.

At the meeting of the board of directors of American Institute of Electrical Engineers held in Philadelphia, Oct. 8, the following 12 members were appointed as the official representatives of the Institute upon the American Engineering Council, which is the governing body of the Federated American Engineering Societies, for the term beginning Jan. 1, 1921, and also to represent the Institute at the organization meeting to be held in Washington, Nov. 18-19: Comfort A. Adams, Cambridge, Mass.; A. W. Berresford, Milwaukee; H. W. Buck, New York City; F. L. Hutchinson, New York City; W. A. Layman, St. Louis; William McClellan, Philadelphia; L. F. Morehouse, New York City; L. T. Robinson, Schenectady, N. Y.; Charles S. Ruffner, New York City; Charles F. Scott, New Haven, Conn.; L. B. Stillwell, New York City, and Calvert Townley, New York City.

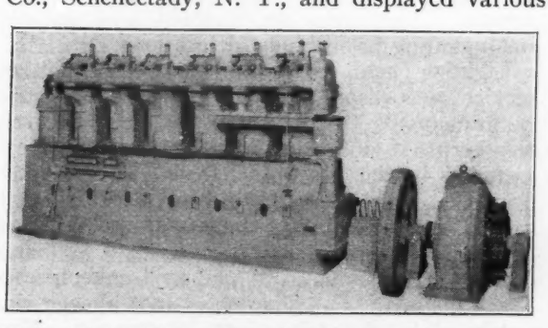
PUBLIC POLICY COMMITTEE TO HOLD MEETING.

The public policy committee of the National Electric Light Association will meet Nov. 4 at the Engineering Societies building, 33 West 39th street, New York City. Sessions will be held morning and afternoon, and will be called to order by S. Z. Mitchell, chairman of the committee.

POWER AND ELECTRICAL FEATURES AT MARINE EXPOSITION.

Electrical Equipment Used on Modern Ships Is Shown in Great Variety—Electrical Manufacturers Well Represented.

Many exhibits of interest to the electrical and power-plant industries were to be seen at the National Marine Exposition held under the auspices of the National Marine League of the United States of America at the Coliseum, Chicago, Oct. 18-23. One of the largest exhibits at the show was prepared by the General Electric Co., Schenectady, N. Y., and displayed various



Model Diesel-Electric Plant for Ship-Propulsion Service Exhibited at Marine Show.

marine electrical equipments and ship-propulsion devices. A full size turbine runner, rated at 2500 hp., and the greater portion of the reducing gear for connection to the shaft were shown. A model of a complete Diesel engine connected to an electric generator, shown in the accompanying illustration, was also on exhibition. A small motor driving a propeller in a tank of water served to show the completion of the propulsion scheme, the entire plant comprising a Diesel engine, generator, switching equipment and controls, motor and propeller. An engine-driven generator set, with portions of the engine cut

away, switchboards, marine motors, magnetic brakes, searchlights and other electrical devices were included in the exhibit.

A complete oil-burning engine of the marine type, suitable also for stationary use, was on display in the booth of Fairbanks, Morse & Co., Chicago. This engine attracted much attention, showing the keen interest being taken in the development of this type of prime mover.

Todd mechanical oil burners, made by the White Fuel Oil Engineering Co., New York City, were on display in another booth. One complete burner for a 450-hp. boiler was shown assembled and ready to install.

An interesting display of motors by the Electro Dynamic Co., Bayonne, N. J., presented several styles of motor equipment for marine service. Practically all of the models shown would be suitable for land service in locations requiring rugged construction or where objectionable surroundings have to be overcome. The New York Engineering Co., New York City, displayed a model of the Ludlum water-tube marine boiler which is now finding fields of application in various classes of land service as well as on the water. An electric rivet heater was in service in the booth of the American Car & Foundry Co., New York City.

Information on traveling water screens, electric coal and ash hoists, and other power-plant questions was being given at the booth of the Link Belt Co., Chicago. Motor-operated package conveyors and hoists were demonstrated by the Brown Portable Conveying Machinery Co., Chicago., and three-wheel storage-battery tractors were shown by the Mercury Manufacturing Co., Chicago. Self-contained turbine-generator units in sizes from 500 watts to 5 kw. were displayed by the Pyle-National Co., Chicago. These units are being used on locomotives for train lighting and in many isolated plants for night service as well as in marine service. The units are inclosed and suitable for mounting in all kinds of locations.

Lighting equipment for marine and other services was displayed by the Benjamin Electric Manufacturing Co., Chicago. Fittings, fixtures, weatherproof globes and many other devices were included in the exhibit. John A. Roeblings Sons Co., Trenton, N. J., had an exhibit of wire, cable rope, etc., and exhibits of valves were shown by the Crane Co., Chicago; D. T. Williams Valve Co., Cincinnati, O., and by Lunkenheimer Co., Cincinnati, O. The Atlas soot blower was exhibited by the Atlas Soot Blower Co., New York City., and motor-operated CO_2 refrigerators were shown by the Kroeschell Brothers Ice Machine Co., Chicago. Packing, gaskets and mechanical rubber goods of all kinds for power-plant service were displayed in great variety by the United States Rubber Co., Akron, O.

The Texas Co., New York City, had on exhibit a large number of samples of oil for almost every conceivable purpose. Cylinder oils, motor oils, wire-rope oils, fuel oils, oil-engine oils, and many others were included in the list.

R. G. Hollaman, Brooklyn, N. Y., is president of the National Marine League of the United States of America; A. A. MacKinnon, Brooklyn, N. Y., is vice-president, and Capt. J. A. H. Dressel, New York City, who was in charge of the exposition, is general superintendent.

SPEAKERS HONOR MEMORY OF GEORGE WESTINGHOUSE.

At a meeting at the Westinghouse Club, Wilkinsburg, Pa., Oct. 6, to commemorate the 74th birthday of the late George Westinghouse, Col. H. G. Prout, a life-long friend of the inventor, told of his personal attributes and many achievements. The speaker was introduced by E. M. Herr, president of the Westinghouse Electric & Manufacturing Co. The purpose of the talk was to give a picture of the individual, bringing forward his principal characteristics, physical, intellectual and spiritual. To that end quite a number of anecdotes were introduced and also some reminiscences contributed by some of the oldest foremen in the employ of the companies, showing how human Mr. Westinghouse was and how close his sympathy with the men in his employ. An effort was made to indicate the great outstanding qualities of imagination, fortitude, persistence and energy, and a striking picture was given of his enormous productive capacity, as shown by the great number and variety of his inventions and also by the great number of concerns he organized and carried on simultaneously.

SUPPLY JOBBERS' ASSOCIATION TO MEET IN CLEVELAND.

The semi-annual meeting of the Electrical Supply Jobbers' Association will be held Nov. 17-19, at Cleveland. During the convention headquarters will be maintained at the Hotel Cleveland.

NEW YORK SECTION, A. I. E. E., TO DISCUSS POWER PROBLEMS.

Because the date for holding the regular monthly meeting of the New York Section, American Institute of Electrical Engineers, falls on Nov. 26, the evening following Thanksgiving Day, it has been decided to postpone the meeting until Friday evening, Dec. 3. The subject to be considered is the "American Power Problem," and it will be a joint meeting with the Metropolitan Section of the American Society of Mechanical Engineers.

NEBRASKA COMMISSION IS GIVEN INCREASED POWERS.

By a vote of the people taken at a special election held last month citizens of Nebraska adopted 41 amendments to the state constitution. The commission regulating public utilities of the state is given largely increased powers under the amendment. One provides that every public utility corporation or common carrier doing business in Nebraska shall report, under oath, to the commission on all such matters as it may require. The purpose of this is to facilitate public regulation. It was opposed by municipal ownership advocates because this will enable the commis-

sion to do what has long been deemed desirable; that is, to require municipally owned corporations to make reports on the same forms which experience has shown the commission are necessary from all utilities in order that a truthful report of their operations may be available for public inspection. The amendment carried by a vote of four to one.

Another important amendment to the constitution creates an industrial commission much after that of Kansas, which is intended to provide a means by which strikes may be prevented in the public service or wherever the welfare of the public is involved. The commission will have the power to investigate, require the submission to it of all such controversies where the public service is endangered, and is given the right to determine the issues of the controversies.

MEETING OF A. I. E. E. TO BE HELD IN CHICAGO.

The regular November meeting of the American Institute of Electrical Engineers will be held at the City Club, Chicago, Nov. 12, under the auspices of the protective devices committee. The electrical section of the Western Society of Electrical Engineers has been invited to participate in the proceedings. The following papers will be presented: "Lightning Arrester Spark Gaps," by Chester T. Allcutt; "Life and Performance Tests of Lightning Arresters," by N. A. Longee; "Studies in Lightning Protection on 4000-Volt Circuits," by D. W. Roper, and "Electrostatic Condensers," by V. E. Goodwin.

SMALL STOCKHOLDERS IN A. T. & T. CO. RAPIDLY INCREASING.

Campany Has Wider Distribution of Ownership Than Any Other Corporation—One-fourth of Employes Are Stockholders.

H. B. Thayer, president of the American Telephone & Telegraph Co., New York City, sent out the following statement to the stockholders of the company on Oct. 15:

"That the ownership of the American Telephone & Telegraph Co. is becoming more and more national and representative is shown by the latest analysis of the records of stockholders of the corporation. Not only are the proportions of stockholders in the various sections of the country becoming more equalized but the proportion of small stockholders is increasing rapidly. Of all American corporations this company is third in the amount of stock outstanding, but it is first in number of holders of common stock. Of the big corporations it has, perhaps, the widest distribution of ownership and the smallest average holdings per stockholder. There are now over 135,000 recorded owners of the company's stock and the average holdings are less than $3300.

"Another interesting development is the entrance in the last four years of a large body of employe stockholders. Under an easy payment plan which the company announced to employes Jan. 1, 1915, and an extension to this plan in March, 1916, over 23,400 of those purchasing shares continue to hold stock. On Dec. 1, 1919, a new offer of stock was made under which any employe of at least one year's service could purchase a limited number of shares, paying for them at the rate of $3 per share per month. This offer has proved very popular; 46,126 employes in August, 1920, were making payments on 184,580 shares, an average of four shares each. It is probably that 25% of the stockholders will be employes and 25% of the employes will be stockholders when the employes now purchasing stock finish paying their installments."

CHICAGO CAMPAIGN TO CONSERVE COAL THIS WINTER.

The Chicago Association of Commerce made its first move last month in a campaign to get that city through the winter months without serious suffering from lack of coal in homes and factories. With this object in view the coal committee of the association decided to designate Sept. 25 as "Coal Tag Day" to impress upon the people the necessity of saving coal. To make the appeal popular 150,000 tags were printed, miniature coal scuttles being inscribed on one side with the words, "Save Electricity. We Must Save Coal," and on the other side, "Save Gas. We Must Save Coal." The distribution of the tags was made through 1000 boy scouts stationed at street intersections in the loop and at frequented corners throughout the city giving the tags free to passersby. Another method of distribution was through the industrial companies of the city, manufacturing and other plants, that are big users of coal for light and power.

Tag Used by Chicago Association of Commerce in Effort to Save Coal.

From the comment of those who were tagged it was clear to those who studied the undertaking that the lesson was being driven home, and that the public generally was really impressed with the seriousness of the situation and the necessity of everyone helping in its solution.

DATA ON ELECTRIC MOTOR TRUCKS IN NEW YORK CITY.

Statistics presented in chart form at the electric vehicle division of the New York Electrical Show indicate that electric motor trucks enjoy long lives, at least in New York City. For example, there are five of these vehicles owned

by the Tiffany & Gorham companies which have been in regular service for over 22 years. In the metropolitan district there are 74 electric trucks 15 years old and still going. Ten-year service records are held by 395 trucks, while 2448 are five years old and 2889 are now four years old.

As there are now a total of 4475 electric motor trucks in the metropolitan district, the figures from which the above are taken mean that over half of them have been in service for five years and approximately 65% of the total have been in service from 5 to 22 years. Another interesting fact shown in the statistics is that in the last 17 years the cost of electrical energy for charging batteries of electric trucks in the metropolitan district has decreased 60%, while in the same period the price of gasoline has advanced 155%.

GEAR MANUFACTURERS TO DISCUSS STANDARDIZATION.

Standardization and costs are closely related, and for this reason will be the principal subjects discussed at the semi-annual meeting of the American Gear Manufacturers Association, to be held at Monhonk Lake, N. Y., Oct. 27-29. Among the speakers will be P. G. Agnew, secretary of the American Engineering Standards Committee, and Calvin W. Rice, secretary of the American Society of Mechanical Engineers, both of whom will speak on "Standardization"; C. L. Collins, president of the Reliance Electric & Engineering Co., and past president of the Electric Power Club, whose subject will be "Industry Organization," and Christopher Haigh, supervisor of costs, General Electric Co., who will describe the "Machine Rate Method of Distributing Expense." At a banquet to be held Oct. 28, Charles W. Woodward, vice-president of the Hydraulic Pressed Steel Co., will speak on "The Human Element in Industry."

HYDROELECTRIC PLANT TO BE CONSTRUCTED IN ARIZONA.

One of the largest hydroelectric and irrigation projects in the Southwest is to be undertaken near Planet, Ariz., by the Stone Consolidated Copper Co., as shown by surveys which it has just filed with the state authorities. It is planned to construct a dam across the Big Williams fork of the Colorado river at a point near Planet and to impound a sufficient supply of water to irrigate 276,000 acres of desert land. The storage supply of water also will be used for generating electric power for operating the mines and industries of a big scope of territory. The Stone Consolidated Copper Co. has been at work on its preliminary plans for the project for some time and construction work will be started soon.

NORWEGIAN TELEPHONE COMPANY ORGANIZED BY AMERICANS.

The International Western Electric Co. has completed the organization of a Norwegian corporation to handle all of its Scandinavian business. It will be known as the Western Electric Norsk Aktiesekskap. Its headquarters are located in Christiania. E. A. Brofos, who has been representing the Western Electric Co. in Northern Europe for several years, has been appointed manager of the new concern. The Norwegian company has already succeeded in securing several large contracts. One of them covers the supply and installation in Christiania of a full automatic telephone system consisting of 31,000 subscriber lines. It has also closed negotiations for the installation of an automatic system in Copenhagen for the Danish government.

SCHENECTADY SECTION HEARS PAPER ON ICE PROBLEMS.

"Some Ice Problems and Their Solutions" was the title of a paper read before the Schenectady Section, American Institute of Electrical Engineers, Oct. 15, by John Murphy, electrical engineer, Dominion of Canada, Department of Railways and Canals, Ottawa. He demonstrated by means of motion pictures experiments showing how anchor ice is formed and how hydroelectric plant operators can overcome the consequent difficulties by the proper application of heat.

SALT LAKE CITY CHOSEN FOR 1921 CONVENTION, A. I. E. E.

Announcement has been made by the board of directors of the American Institute of Electrical Engineers that the 1921 annual convention of the association will be held jointly with the Pacific Coast convention at Salt Lake City, Utah, during the week commencing June 20. The principal argument in favor of combining the two conventions, as advanced at the Portland (Ore.) convention in July last, was the desirability of bringing the eastern and western members of the Institute together occasionally for an interchange of ideas, instead of holding the annual convention in the eastern portion of the country, attended by very few of the far western members, and the Pacific Coast convention, attended by only a few eastern members.

COMING CONVENTIONS.

Electrical Supply Jobbers' Association of the Pacific Coast. Quarterly meeting, Del Monte, Cal., Oct. 21-24.

National Association of Railway and Utilities Commissioners. Annual convention in the board room of the Interstate Commerce Commission, Washington, D. C., Nov. 9-12.

American Institute of Electrical Engineers. Meeting in Chicago Nov. 12 under auspices of the Protective Devices Committee. Secretary, F. L. Hutchinson, 33 West 39th street, New York City.

Electric Power Club. Fall meeting. Hot Springs, Va., Nov. 15-18. Headquarters, Homestead Hotel. Secretary, C. H. Roth, Adams and Loomis streets, Chicago.

Electrical Supply Jobbers Association. Semi-annual meeting, Cleveland, Nov. 17-19. Headquarters, Hotel Cleveland. Secretary, Franklin Overbagh, 411 South Clinton street, Chicago.

Southeastern Geographic Division of the National Electric Light Association. Annual convention, Miami, Fla., Nov. 17-19. Secretary, Charles A. Collier, Atlanta, Ga.

Jovian Order. Annual convention, St. Louis, Nov. 25-26. Headquarters, American Hotel Annex.

American Institute of Chemical Engineers. Winter meeting, New Orleans, La., Dec. 6-9. Headquarters, St. Charles Hotel. Secretary, John C. Olsen, Polytechnic Institute, Brooklyn, N. Y.

COMMERCIAL PRACTICE

New-Business Methods, Policies, Rates and Kindred Central-Station Matters for the Man Engaged in Selling Electricity

PUBLICITY CAMPAIGN FOR THE ELECTRICAL INDUSTRY.

National Electric Light Association Inaugurates General Good-Will Campaign—Co-operation of Electrical Manufacturers Assured.

Among the problems facing the electric light and power industry today are those of finance and regulation. Executives and influential men intimately associated with and deeply interested in the electrical industry invariably state that the present single outstanding need of the electric light and power industry is the securing of adequate financial support for extensions of plant and transmission equipment. With this end in view conferences with investment bankers, insurance companies, electrical manufacturers and the press have resulted in the beginning of a national campaign of information and education which it is expected will produce satisfactory results.

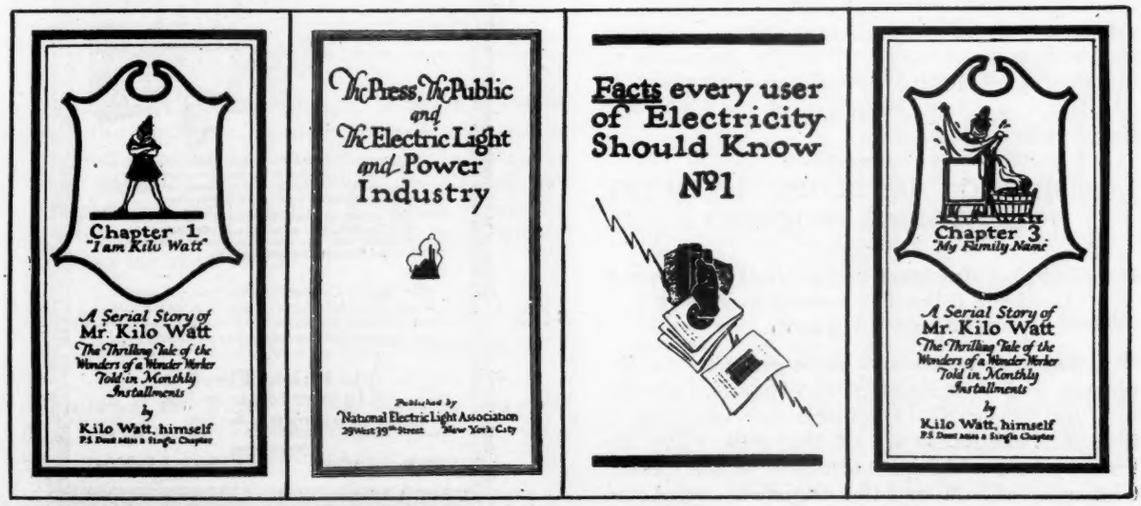
The electric light and power companies are in the hands of the public; they are in a peculiar position, as they are dependent upon the public for patronage and at the same time rely upon such patronage to fix the rates they can charge for service and to frame the rules and regulations under which they shall give service. This power of the public is vested in state or municipal regulatory bodies. In the United states, 45 of the 48 states have regulatory commissions, practically all of which are empowered to control both the service and rates of electric light and power companies. These commissions invariably act for what they consider to be the best interests of the public. In this they necessarily are governed by the wishes of the public as they, the commissions, interpret them.

The solution of the problem, therefore, is fundamental. It is the enlightenment of the public so that it will understand not only generally, but specifically, every important phase of the electric light and power industry. With this object in view the National Electric Light Association has inaugurated a campaign to acquaint the general public and present and prospective stockholders of utility securities with every element of the electric light and power industry. A campaign extending over at least a year has been devised and a figure known as "Kilo Watt" adopted for use in pamphlet form, or for general advertising, as a medium and point of contact with the housewife and householder. The first six of this series of pamphlets have been prepared and sent out with a plan of campaign, together with three other pamphlets defining some of the terms and facts regarding the electrical industry.

Pamphlets Designed to Arouse Interest of Customers.

It is suggested that electric light and power companies should use both the "Kilo Watt" pamphlets and those entitled "Everyday Electrical Terms and Usage" and "Facts Every User of Electricity Should Know" in a simultaneous campaign to educate the public. The two latter pamphlets are designed to be placed upon the information counter and handed out by the information clerk whenever it is possible to arouse the interest of a customer in the terminology and practices of the electric utility. To supplement the campaign, many companies will find it advisable to publish each pamphlet as a paid advertisement in the local newspapers at the same time it is sent out to customers.

The "Kilo Watt" series so far distributed runs


Chapter 1
"I am Kilo Watt"
A Serial Story of
Mr. Kilo Watt
The Thrilling Tale of the Wonders of a Wonder Worker Told in Monthly Installments
by
Kilo Watt, himself
The Press, The Public and The Electric Light and Power Industry
Published by
National Electric Light Association
Facts every user of Electricity Should Know
No 1
Chapter 3
"My Family Name"
A Serial Story of
Mr. Kilo Watt
The Thrilling Tale of the Wonders of a Wonder Worker Told in Monthly Installments
by
Kilo Watt, himself

Pamphlets Being Distributed for the Purpose of Acquainting the Public with Various Phases of Electric Light and Power Industry.

from Chapter 1 to 6. Another series will follow dealing with work done, financing, water power, cost of operation, taxation, regulation, securities and kindred subjects. The purpose of the "Kilo Watt" pamphlets is to set the stage with the first six of the series by appealing to the housewife and householder in a manner in which they can understand and appreciate electric service and the electrical terms which are explained therein. It is hoped by this means to arouse their interest and get them accustomed to receiving a copy of a "Kilo Watt" pamphlet each month, so that with the second series of six it will be possible to use "Kilo Watt" to carry to consumers the real financial and good-will problems of the electric light and power industry.

With this campaign as a basis, and yet entirely separate and distinct from it, the manufacturers of electrical equipment, apparatus and appliances are about to start a national campaign of cooperation with the electric light and power industry to the end that public good-will may be fostered and the public utilities commissions upheld in their efforts to give fair treatment to public utilities. In this connection there has been organized a manufacturers advertising committee as a subcommittee of the Public Relations Section of the National Electric Light Association.

UTILITY COMPANY OFFERS PRIZES TO OKLAHOMA STUDENTS.

An ad-writing and feature-story contest, for which prizes to the amount of $150 have been provided by the Oklahoma Gas & Electric Co., has been opened to students in advertising and news-writing in the school of journalism at the University of Oklahoma. The contest began Oct. 8 and will last ten weeks. Advertisements and feature stories adapted to the use of public utility companies will constitute the basis of the contest. Weekly prizes for the winners in each group will be given, and at the end of the contest the student who stands highest as an ad-writer, or as a feature writer, will be given one of the two $50 grand prizes.

Advertising men and editors of Oklahoma City have been selected as judges for the contest and the winning ads and stories will be published in a number of Oklahoma newspapers. The contest is being conducted jointly by members of the faculty of journalism of the University of Oklahoma and representatives of the Oklahoma Gas & Electric Co.

LECTURES ON DEVELOPMENT IN THE ELECTRICAL INDUSTRY.

Non-Technical Employes of Electrical Industries in Louisville Given Opportunity to Attend Educational Classes.

A series of lectures is to be given in the Engineers and Architects Club room, Louisville, Ky., for the benefit of non-technical employes of the electrical industries of that city. The lectures are under the joint direction of the Electric Club of Louisville and the Engineers and Architects Club. The privilege to participate and the benefits of this course are being extended to any person interested in the development and progress of the electrical industry. The cost to members of directing clubs is $1.50 and to non-members $3.

The following is the schedule arranged: Oct. 25, "Generating and Substation Equipment for Light and Power," by E. D. Wood, Louisville Gas & Electric Co.; Nov. 1, "Distribution Systems," by G. M. Miller, Louisville Gas & Electric Co.; Nov. 8, "Interior Wiring for Light and Power. Wiring Devices, Wires and Cables," by E. C. Thirlwell, Marine Electric Co. and E. C. Kopf, Kentucky Actuarial Bureau; Nov. 15, "Meters and Instruments," by G. W. Schafer, Louisville Gas & Electric Co., and G. T. Bogard, Kentucky Utilities Co.; Nov. 22, "Selling Electricity," by W. D. Myers, Louisville Gas & Electric Co., and G. T. Bogard, Kentucky Utilities Co.; Nov. 29, "Incandescent Lamps and Interior Lighting," by J. B. Riley, Franklin Electric Co.; Dec. 6, "Motors and Industrial Control," by S. B. Storm, Marine Electric Co., and W. D. Myers, Louisville Gas & Electric Co.; Dec. 13, "Railway Substations and Car Equipment," by F. H. Miller, Louisville Railway Co.; Dec. 20, "Administration," by L. B. Harrington, Kentucky Utilities Co.

BOOKLET DESCRIPTIVE OF SERVICE INSTALLATIONS.

The United Electric Light & Power Co., New York City, has issued a booklet illustrating some of the diversified types of buildings, industries and factories which that company is supplying with electrical energy. The booklet is composed of advertisements now appearing in the daily press.

Supplied with United Electric Service
527 to 531 Madison Avenue
A fifteen story, ultra-modern building intended to satisfy the demand for small unfurnished apartments in a refined residential section, readily accessible to all parts of the city.
The owners and builders are the Waitt Operating Co. Inc., the architects, Messrs Schwartz & Gross and the electrical contractors, The United Electric Construction Co.
for you—a Commercial Department of competent engineers who will be pleased to consult with you or render advice, without cost or obligation, on all matters of electric light, heat and power service.
The United Electric Light and Power Co.
130 East 15th St., New York.
Branch Offices
89th St. & Broadway
146th St. & Broadway

Sample of Advertisement of United Electric Light & Power Co.

CONTRACTING-CONSTRUCTION

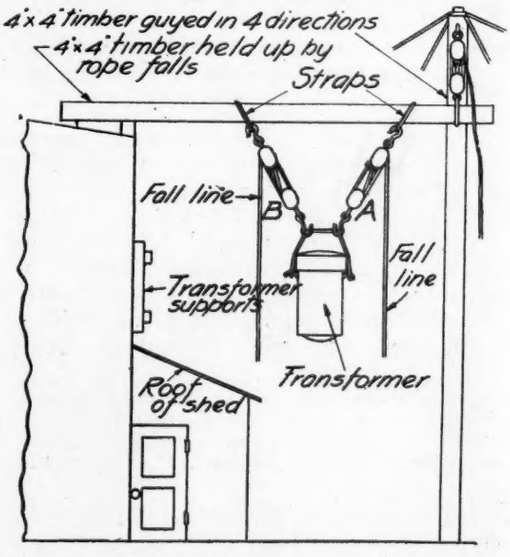
A Department Devoted to Various Problems Relating to the Installation, Operation and Maintenance of Electrical Equipment

INSTALLING TRANSFORMER ABOVE ROOF OF A SHED.

Temporary Derrick Rigged With Timbers and Rope Tackle Facilitate Difficult Construction Job.

By ARTHUR S. NICKERSON.

The hanging of a transformer on a wall above the roof of a shed was accomplished by the use of the temporary rigging shown in the accompanying sketch. The transformer was lifted from the ground by both tackles, *A* and *B*, then the weight was all taken on *B* and the strap on tackle *A* was moved up close to the strap on tackle *B*. The fall line on *B* was then tightened to carry the weight while the strap on tackle *B* was moved towards the wall. This process was



Rig for Handling Transformer Over Roof of a Shed.

repeated, walking the straps across the timber over the shed roof, until the transformer was in position opposite the supports. It was then an easy matter to finish the job of installation and complete the connection. The sketch shows the conditions existing while the load is being shifted from tackle *A* to tackle *B*.

EXAMINATIONS IN PORTLAND FOR SUPERVISING ELECTRICIANS.

Theoretical and Code Questions Must Be Answered and Actual Mechanical Skill Must Be Demonstrated.

Under the provisions of the electrical code of the city of Portland (Ore.), every electrical contracting concern doing work in that city is required to have a registered supervising electrician whose certificate from the bureau of buildings empowers him to countersign applications for electrical permits. In each case the supervising electrician may be a member of the contracting concern or one of its employes.

The certificate of registration as a supervising electrician is issued after the applicant has passed an examination conducted by the board of examiners which is composed of three members who are appointed by the mayor. The contracting concern pays a license fee of $50 for the first year and $25 annually thereafter. The supervising electrician pays an examination fee of $10 and a registration fee of $1.

Examinations are held quarterly, and require the answering of code questions without books or other aids, the working out of problems for which any text books may be used and practical work in the laboratory and shop. Grades of 40, 20 and 40%, respectively, are assigned to the three portions of the examination. The applicant, in order to be entitled to a certificate, is required to pass with a standing of at least 70%.

TYPICAL EXAMINATION FOR SUPERVISING ELECTRICIAN IN PORTLAND.

In the examination held this summer the code questions, problems and practical work submitted were as follows:

Code Questions.—

(1) If you had two electrical systems to install—one a 110-220-volt three-wire system and one a 1000-volt two-wire system—would you use the same rubber-covered wire to install these systems? Explain why.

(2) In attics reached by scuttle holes, how must circuit wires be installed when they run within 4 ft. of these holes?

(3) How must an electric heating device of over 600 watts capacity be attached to a circuit?

(4) By what must each motor and its starting device be protected and controlled to conform to the code?

(5a) How many two-wire circuits, without special permission, may be placed in the same iron conduit, leaving out of consideration stage pockets and border circuits?

(5b) How many braids must a single rubber-covered wire of No. 8 B. & S. gauge have to make it comply with the requirements for a conduit installation?

(6) How deep does a cabinet have to be to conform to the code when a double-throw three-pole knife switch is used to start a three-phase motor?

(7a) Where do porcelain or insulated-chain pull sockets have to be used?

(7b) When do metal cabinets or main services have to be grounded?

(7c) How should the ground wire be installed to conform to the code?

(8) How must oil transformers be installed inside a store or factory building?

(9) What controls the size of the fuse in a branch circuit?

(10a) Explain how you would install a combination gas and electric fixture on a metal ceiling.

(10b) Same for straight electric outlet having a gas stub.

Problems.—

(1) Calculate the size of wire to be used for the following motors:

(a) One 10-hp., 220 volt d-c. motor of 60% efficiency.
(b) One 5-hp., 110-volt three-phase, 60-cycle induction motor of 50% efficiency.

In all cases the results are to conform to the city code.

(2a) What size of rubber-covered wire in conduit should be used to conform to the requirements of the city code with an allowable drop to the farthest lamp of two volts, the load consisting of 42 incandescent lamps which take one ampere each? The distance is 200 ft. on a single-phase two-wire system.

(2b) Same on a three-wire, 110-220-volt d-c. system.

(3) Define "Ohm's law" complete with formula and give examples.

(4) Given ten circuits of sixteen 40-watt lamps at a distance of 110 ft. from service entrance, ten circuits of 20-ampere 110-volt electric heaters at a distance 90 ft. from the service entrance, two 5-hp. 230-volt d-c. motors at a distance of 150 ft. from the service entrance—all to be connected to a three-wire system with individual circuits to be run from one center of distribution—specify the following:

(a) Minimum capacity of main service feeders in amperes.
(b) Minimum capacity of sub-feeders in amperes.

Practical Problems.—

(1) Draw a diagram of a master control on a two-wire service, wiring in two sets of three ways on two separate circuits.

(2) Do the same on a three-wire service.

(3) Bending and fitting conduit to a surface.

(4) Wire in a combination outlet complete, controlled by a two-point electrolier switch.

(5a) Connect up a shunt-wound motor to a rheostat and reverse the motor.

(5b) Explain the difference between shunt, series and compound-wound motors.

INSPECTION DEPARTMENT INTERPRETS VARIOUS RULES.

Proper Consideration Should Be Given When Paralleling Conductors of Unequal Size and Equal Length.

The September bulletin of the bureau of electrical inspection of the city of Chicago contains a number of valuable comments relative to electrical construction work. The following quotation relates to interpretations to be placed on a recently adopted "safety switch" rule:

"The new rule on the safety-type switch contemplates the use of this switch *wherever it is practicable to use it.* In apartment buildings and residences a safety-type service switch should always be provided, the branch-circuit cutouts being placed in a separate cutout box. The same ruling applies to other installations of both light and power.

"Distribution centers consisting of one main line switch and a number of branch cutouts (either not switched or provided with snap switches) should have a switch of the safety type with the cutouts in a separate inclosure. Distribution centers consisting of one main-line switch and a number of smaller branch-lighting-circuit knife switches do not require the safety-type switch. Where distribution centers consist of a number of large switches the safety-type switch should be used where there are three switches or less. Where there are more than three switches a panelboard or switchboard in a standard cabinet may be used.

"In the case of apartment buildings with one circuit to an apartment a safety switch may be used for each apartment up to and including three switches, and such switches will be accepted as service switches. Where there are more than three circuits a main-line service switch of the safety type must be provided with a separate cabinet for the fuses.

"Until Jan. 1, 1921, old-type knife switches moved from one location to another within the same building will be accepted by the department provided they are of standard construction and in good condition. The same ruling applies where a concern moves its apparatus from one building to another at a different location. After Jan. 1, 1921, new work installed in the above described locations must have the safety-type switch."

The following quotation calls attention to a mistake frequently made in paralleling conductors where capacities are needed in excess of those for which single cables are available:

"Contractors occasionally make the mistake of attempting to parallel cables of large capacity and of unequal size on a basis of their rated carrying capacity. Where wires are run in parallel the current will divide in proportion to the cir. mil area of each cable and not in proportion to their rated carrying capacity. As an example: The rated carrying capacity of 1,000,000-cir. mil cable is 650 amperes, and of 500,000-cir. mil cable is 400 amperes. If two cables of the above capacities were paralleled with a current of 1050 amperes (their combined carrying capacity) the 1,000,000-cir. mil cable would take 700 amperes and the 500,000-cir. mil cable 350 amperes. The 1,000,000-cir. mil cable will therefore be overloaded.

"Where it is necessary to parallel wires on three-phase systems the wires should be so grouped that there will be a complete set of phase wires in each conduit. If two wires are paralleled up one phase, there would be two conduits with a set of three-phase wires in each. If three wires are paralleled on each phase there will be three conduits with a set of three-phase wires in each. At each end of the conduit run, all the wires should be brought together in a common junction box."

HAZARDS OF PRIVATE LIGHT PLANTS POINTED OUT.

Wisconsin Industrial Commission Recommends That National Electrical Code Be Followed in Low-Voltage Construction.

Installations of low-voltage farm-lighting plants are growing rapidly in number, and the Wisconsin Industrial Commission has seen fit to issue a bulletin and a leaflet dealing with the question of safety of these equipments. The leaflet points out the fact that such installations should be installed only by competent persons and only in a substantial and workmanlike manner. The following quotation is taken from the leaflet:

"Because of prohibitive expense only a few nearby farmers can connect with city plants; others must depend on private plants for electric light, heat and power. These systems are of low voltage and the dangerous theory is quite common that therefore they are free from life and fire dangers. Neither of these dangers depend solely on voltage. A strong, well man may survive a severe electric shock; a slight shock may be fatal to one with a weak heart. Standing on a dry floor or a rubber mat, it may be safe to touch a knife switch or a brass socket; standing on a wet floor or in a bath, this is dangerous.

"In a building where there is nothing to burn, poor wiring may do no harm. Such is not the case in farm barns particularly. The dampness of the stock barn is destructive to wire insulation, and a short-circuit may at any time ignite the gathered cobwebs. In the hay-loft hay, straw, cobwebs and dust are usually in contact with wires, fixtures and uninclosed switches and fuse blocks. Under these conditions the slightest electric trouble may cause a disastrous fire. Conduit wiring is advisable in barns. All work should be done in strict conformity with the National Electrical Code. This is the standard throughout the land, and the legal standard of this state.

"Farmers can do no better than to purchase these plants, installed, from some known, reputable dealer, under contract that all work comply with said code. A reputable dealer cannot afford to let either death or fire come back to plague his conscience because of incompetent work. Shun the man who tells you that these plants are free from danger and that expert knowledge is not needed to install them. Mr. Farmer, your buildings house ever-increasing values. You are not prepared to fight fire. Prevention is your only protection."

CONTRACTOR-DEALER

An Exchange of Ideas and Experiences on Advertising and Selling Methods, and Store-keeping for the Dealer in Electrical Goods

LIGHTING DISPLAY ARRANGED FOR HALLOWE'EN WINDOW.

Show Window of Electrical Store Suggests Harvest Festival Spirit, With Necessity for More Lamps During Long Evenings.

To a number of contractor-dealers who like to have their window displays reflect each event and season, the Hallowe'en spirit suggests lights and shadows—plenty of lamps and autumn colors. This event also suggests the end of the warm season and the coming of winter with its long evenings and necessity for more lights and comfort engendered by the electric heater.

Hallowe'en Window Display Prepared by Haenig Electric Co., Springfield, Ill.

The window display shown herewith was dressed by the Haenig Electric Co., Springfield, Ill. In this window a goblin lighting effect was obtained by the flashing of colored lamps installed inside the pumpkins and from hidden head and footlights. A bank of white Mazda lamps dominated the display from a central position.

SOME SPECIALTIES SUITABLE FOR HOLIDAY TRADE.

Boudoir lamps, telephone covers and tea cosies are being made up in forms of decorative dolls gaily and handsomely gowned. A doll 20 ins. high and gaily gowned in silk or satin may be a boudoir lamp with the lamp concealed under a little silken parasol. Perhaps the silken gown itself may be the lamp shade and the dolly standing so demurely upon the dressing table may glow with rosy light at the pressure of a button. The idea of doll lamps is of French origin, but the products as seen in electrical stores are of American manufacture.

PORTRAYAL OF TWO SIDES OF THE FIXTURE BUSINESS.

Speaker at National Contractor-Dealer Convention Cites Examples of Dealer Who Profits and One Who Fails in Fixture Trade.

During the recent national convention of contractor-dealers in Baltimore, J. L. Wolf, secretary of the Lighting Fixture Dealers' Society of America, punctuated his address on "The Proper Handling of Fixture Sales" by relating the experiences of two dealers. One of these dealers made a success of the business which he is still conducting profitably. The other failed, although he did three times as much business on three times as much capital as the successful dealer.

The first dealer mentioned by Mr. Wolf was operating on $10,000 capital. He did a business of $35,000, from which he realized $7500 net profit in one year. His was a fixture business only. He employed a middle-aged clerk who also acted as bookkeeper, shipping and receiving clerk and salesman for a salary of $40 a week. The dealer himself managed the business, was chief salesman and allowed himself $50 a week. Two workmen who did the assembling, wiring and hanging of the fixtures increased the force to four.

Medium-priced fixtures comprised most of the sales of the successful dealer. His method of pricing was to take the cost price of the fixtures, add the cost of sockets, wiring, hanging, etc., and add 166⅔%. He carried $5000 worth of fixed-up stock and by this method was enabled to keep his work uniform and note parts that were short before they were actually needed. By having his motor truck always carry a complete extra set of parts and fittings he was able to finish a job in one trip. He assembled very few goods but bought complete except for sockets and wiring.

The other dealer mentioned by Mr. Wolf was doing a business of $108,000 on $35,000 capital, but earned only $3000 net profits. In the beginning this dealer bought his fixtures complete but soon decided he could make them up cheaper. Business increased and the kind of make-up work he had undertaken was necessarily increased. Still this dealer continued as formerly to sell his goods marked up 100%

without taking into consideration the increased overhead costs. His prices resulted in his receiving a run of orders for the lines for which he undersold competitors, while orders for the higher-priced fixtures were few and far between. This low net profit on the total amount of business done eventually caused the dealer to fail.

Financial Side of Electric Retailing a Subject No Contractor-Dealer Can Afford to Neglect

Caution Necessary to Insure Reasonable Stock Turnover — Selection of Goods Important—Sound Business Methods Assure Ready Banking Credit

By GEORGE J. KIRKGASSER

Present conditions in a few lines such as automobiles, trucks, tires, etc., are somewhat unsettled. But in other fields this is not the case. One cardinal rule of successful merchants is quick turnover, the purchase of goods in comparatively small lots at frequent periods. However, in all cases sufficient stock is carried in the store to indicate prosperity and make the customer feel free and confident to buy from the choice offered.

To purchase big stocks increases the investment and requires larger loans from the bank. A shoe retailer in a small neighborhood had an amateur salesman suggest to him one day that he ought to buy his rubber heels by the carload in order to get the lowest price. Imagine how long that money would be tied up when this particular retailer sold on an average only six pairs of rubber heels a day.

Yet, because a merchant's first object is to have stock for sale he cannot in these times of inadequate railroad transportation take a chance of not having some lines on hand. He therefore compromises, ordering neither extra large amounts nor yet in such small quantities as to be without some lines at times.

Selection of Merchandise Influence Turnover to Great Extent.

How many times do we still see merchants in all lines being influenced to buy goods simply because a 5% greater discount is offered. Take the case of electric flatirons. The well-known and advertised makes move fast, yet we see dealers stocking up sometimes with unknown makes because a profit of 40% or more may be offered.

If it costs 25% to do business, and some standard makes of flatirons carrying 35% discounts are bought four times a year and moved out of the store as many times, the profit is really four times the 10% difference between the discount and the cost of doing business. In other words, the profit is 40%, and the money is tied up only for short periods, which is an advantage when borrowing money.

If the flatiron with 40% discount does not move as fast, and is turned over twice a year, the profit on each turnover is 15%, or 30% on the two turnovers. But with this kind of merchandise there is not the same degree of consumer acceptance, the proprietor or the clerks must talk longer and harder to get the prospective purchaser to buy, or other means of selling the goods must be used.

When prices are going up it is well to borrow as much money as possible in order to get as much merchandise as possible. But when prices are threatening to recede and production increasing, it is particularly advantageous to borrow less and buy in smaller quantities until another level is reached. Present conditions are somewhat between these two points since in many lines production has not caught up with demand.

Borrowing Money Is Important Function in Merchandising.

The electrical dealer, by using up-to-date methods of conducting his business, can make more money by borrowing from his banker and discounting all bills of the jobber or other supply sources. As an example, suppose a $700 bill of goods consisting of wire, tubing, domestic appliances, fuses, etc., carries the terms of 2% discount in 10 days. Here a saving of $14 is at once made and the loan of $700 for a month while the goods are being sold costs $4 at a 7% rate, giving a clear profit of $10. If a dealer buys $21,000 worth of goods during a year he can make a saving of approximately 30 times the $10, or $300 besides his usual profit.

Whether it is borrowing money for the above purpose or for financing a big job that may take time to complete, the contractor or dealer who can show that his methods of doing business are sound and that a good accounting is kept is the one who can most easily secure aid.

Under present conditions, provisions imposed on banks by the Federal Reserve Board make it possible to negotiate loans, if the bank has funds available, for some purposes and not for others. If the prospective borrower is in a position to take up his note in a given time there should be little trouble. This is the case where loans are made to purchase goods, machines to help production, etc., but is not the case where the money is to be used in purchasing real estate, erecting buildings, etc. Where a dealer does a considerable time-payment business, a loan is not so easily negotiated for the simple reason that under present conditions the bank wants to be sure that the money it loans will be put to use where it will bring a comparatively quick return. As the harvest money finds its way into the banks of the country loans can be obtained more readily for commercial enterprises.

Statements should be sent out regularly the first of each month and collections given an important place now. It is not well to be so busy with getting business that the collections are neglected. Cash sales will give you less to worry about during periods when steady employment in factories is not assured.

Bookkeeping and Accounting Necessary to Successful Business.

Every contractor-dealer should be able to know exactly how his business stands at any time. This is as necessary for continued success as anything else. A man may be a shrewd buyer, a top notch salesman and likeable in every way, but if his accounting is slipshod no bank will gamble with him. With a fluctuating market careful and exact measurement of all transactions is very important. That the electrical dealer has seen the advantage of this is indicated by the fact that Dun's ratings show that he is no longer at the bottom of the retailers' list.

President Nicholson of the National Cost Accountants' Association recently made the statement that mercantile success is fundamentally dependent upon accurate cost accounting. The merchant must know his cost of handling and selling goods, as well as the initial cost. Care must be taken not to be caught with too much stock when prices are declining. Banks are interested in knowing whether a dealer can render a monthly credit and loss and balance sheet.

It is a good thing to have the reputation of being a careful buyer, but a reputation for shopping around is not so desirable although by the latter methods small savings may be made at times on some items. In the long run it is best to buy through recognized channels from houses of good reputation and sound business policies. The good merchant does not scatter his purchases by giving many little orders to scores of jobbers and supply houses. Necessarily a number of sources must be available, but he prefers to be a big customer rather than a little one. He concentrates and in this way he becomes worthy of considerable attention by the jobbers who can thus offer him services and assistance when necessary, because his business is something worthwhile to them.

The dealer who thus establishes himself is often given inside information, prompt delivery, advantages in price or choice of selection of goods when possible. When his name is mentioned, the executives recognize it. Because his business is worth having they extend themselves to hold it, readily making right any troubles that arise. The jobbers' salesmen from whom he buys will spend more time with him and he may often get valuable information in this way. If the house is a good one he is thus relieved of considerable work of shopping around, checking up delivery from a score of sources and can devote himself more completely to the task of selling and conducting his own business.

Newspaper Advertisements and Window Displays That Sell Autumn Electrical Necessities

Fall Season Suggests Cleaning Time to Housewife Whose Interest Is Thus More Readily Quickened in Electrical Conveniences That Promise Relief

By W. B. STODDARD

This fall, as never before, the opportunity is presented for electrical contractor-dealers to take advantage of the house-cleaning season and show by window demonstration and newspaper advertising how electrical appliances can eliminate drudgery and do better work than human hands and old-time makeshifts. Some dealers are making the utmost of this opportunity by forcibly attractive windows and advertisements calling attention to the labor and time to be saved with the use of the vacuum cleaner, washing machine, ironer, dishwasher, etc., carrying out the reminder with the suggestion of further escape from fatigue in the use of the toaster, percolator, waffle iron and other electric table conveniences.

Concentrating Sales Efforts on the Vacuum Cleaner.

The man who blows his horn the loudest is the one who will get the business. This means more advertising. A glance at some of the methods employed by energetic dealers in various parts of the country may suggest how other dealers can improve their own service and enliven their displays so as to attract the attention that must be gained before many sales are achieved.

At this season of the year cleaning is the dominant thought in the mind of the housewife. One of the greatest assistants in that kind of work is the electric vacuum cleaner. With this

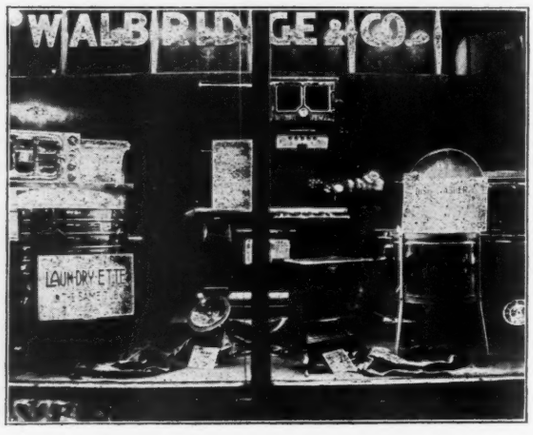
Vacuum Cleaner Display in Window of Newbery Electrical Co., Los Angeles, Cal.

idea in mind the Citizens' Light & Power Co., Oil City, Pa., came out with the following newspaper advertisement headed in big black letters:

STOP RUINING YOUR RUGS!

Don't you know that beating rugs with stiff carpet beaters is the worst thing you can do? Yet, when the imbedded grit is removed only twice a year your rugs lie on the floor for months full of the sharp grit, and every time you walk on them you grind that grit against the soft wool and into the nap. Your carpets and rugs have doubled in value since the war. This country has no wool to waste on prematurely worn carpets. The solution is to clean them regularly with a vacuum cleaner. It will dustlessly beat, shake, sweep and clean all the dirt away and keep it from collecting. Clean carpets and rugs wear years longer—and bright rugs brighten the home.

One window display that would have fittingly co-ordinated with the above advertisement was dressed by the Wilmington Electric Appliance Co., Wilmington, Del. It showed a large green rug sprinkled with white meal. On this rug there had been three panels swept with a vacuum



Mixed Display in Window of Walbridge & Co., Buffalo, N. Y.

cleaner, and at the end of each panel rested the cleaner that did the work. The word "Eureka" was made to stand out by having the meal swept away to form the letters. A large card carried the message, "Your wife was not intended to be a sweeping machine—let the vacuum cleaner do it. It gathers all the dirt and dustlessly cleans the rooms. Don't sidestep—buy this important household necessity now." Another card suggested, "Start your household work right today. Buy a vacuum cleaner. It keeps the dirt away. Demonstration going on inside the store."

The Wilmington company took a full-page advertisement to give further publicity to its vacuum cleaners, offering them on 10-day trials in the home, after which they could be purchased by the payment of $5 down and $5 a month. Demonstration week was Oct. 13-18, during which time the company gave special demonstrations not only of its cleaners, but of all its other electric household appliances.

In Los Angeles, Cal., the Newbery Electrical Co. arranged a window display that was very much similar to the one in Wilmington except that it advertised the Hoover cleaner instead of the Eureka. Added interest was given to the Newbery window by the installation of a wax figure of a woman in house dress operating the sweeper. Black cards with white letters were distributed about the display, among the messages being, "Mr. Man, if you had to sweep you would buy a Hoover," "Step inside for a complete demonstration," "The Hoover increases the life of your rugs by removing all sand, dirt, grit, straightening up the crumpled nap," "Pay monthly. A small deposit will put the Hoover in your home," "Buy the fall bride a Hoover and her new home will always be as fresh and clean as it is today."

CREATING A DESIRE FOR AN ELECTRIC TOASTER.

For the dealer who wanted an advertisement that would especially "tickle the palate" of the reader it would be hard to surpass one inserted by the Puget Sound International Railway & Power Co., Everett, Wash. At the top of the advertisement was shown the picture of a small boy eating toast which his mother was preparing on an electric toaster. The wording was as follows:

"Mm-m-m, Mother, but this toast is good."
There's a deliciousness to toast made the Electric Way that simply can't be beaten. There's something about the flavor of it—a crispy, golden goodness—that you won't find in ordinary toast.

AN ELECTRIC TOASTER.

is just what you need to put "pep" into your autumn breakfast. It invites the family to partake liberally of the "crunchy" browned squares when ordinarily one would eat without an appetite.

P. S. I. R. & P. CO.

An advertisement with such a strong personal appeal could well be supplemented by a certain window display prepared by the Brooklyn Edison Co., Brooklyn, N. Y. This company had a special toaster sale which it advertised on the backs of its monthly electric light bills as well as through the newspapers. A most important factor in its publicity campaign, however, was this particular window display.

Suspended from the ceiling in the window display was a large card reading as follows: "Electric Toaster Sale. $5.55—$2.55 down and $3 with your monthly bill. Crisp, Brown, Hot, Delicious Toast." A card on the side wall was emblazoned in large letters, "November Toaster Sale," and white ribbons ran from the card to the table on which was an electric toaster and a plate of toast. Other tables held fancy table lamps with ribbons running to the toaster. Other cards lettered in white, with a fine line of red, were scattered throughout the window bearing such messages as, "Toast perfectly made is toast electrically made." "Prepare your breakfast toast on the dining room table." "Any lamp socket supplies the current." "An electric toaster prepares a slice in a minute." "The little electric toaster will prepare 15 slices of delicious, brown toast for a cent's worth of electricity—and it's sure to be hot." "Toast for all occasions—Toast is universally recognized as a breakfast food, but it also has its place in the sick room, after-theater spreads and luncheons. Electric toast is made right at the dining room table with but little effort." Each card gave a reason for the toaster.

Home comforts of all kinds are more appreciated in the winter than at any other time, and the convenient little electric heater would be even more popular than it is today if it were given more needed publicity in a way to show its convenience. It does very well to tell what such a heater will do, but the best way is to show it. That is what John E. Graybill & Co., York, Pa., did in a very catchy manner.

The company fitted up one of its windows to simulate a bathroom, including a modern porcelain tub. Near the tub was a wax figure of a woman in a silk kimono, her hand reaching out to press a button on the wall. Down in front was an electric heater. A card near the button advised: "Click! The Bathroom's Warm! A chilly bathroom can be made delightfully warm with an electric heater. A snap, and the heat starts; it glows warm almost instantly; quickly dispels the chill; causes your shivers to cease, and you bathe in comfort. That is only one advantage of an electric heater. A big item—it saves coal."

Mr. Graybill said that his heater window attracted an immense amount of attention and that he maintained it a week, changing the settings every two days. The first display was arranged on Monday. On Wednesday he took out the single wax figure and placed in the room a baby's bathtub in which was the figure of a smiling baby being given a bath by its mother. This time the card read: "A warm room for baby's bath. Athletes and vigorous people may spurn heat, but baby must be protected when having his bath—the most convenient and economical method is by using the portable electric heater."

The third and last change for the week showed a man standing by the mirror and shaving himself. For this display there was used in addition to the heater a little electrical device for heating the shaving water. Another appropriate card accompanied this display.

"The constant reiteration of the comforts of an electric heater for the bathroom, and the way in which we showed its convenience for all members of the family resulted in a fine crop of orders," said Mr. Graybill. "It took a little time to work out the settings, but practically no expense as the figures were borrowed from a dry-goods store, the firm being only too glad to lend them for the added publicity it gave their line of clothing."

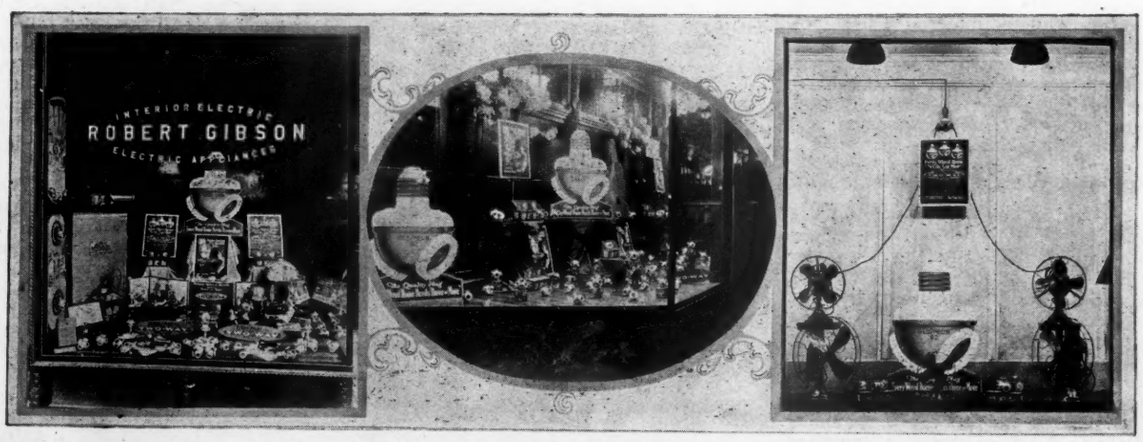
For a general all-round commodity window, featuring the unromantic but practical household labor-saving appliances, that of Walbridge & Co., Buffalo, N. Y., could well be emulated. At one end was a dishwasher in operation, a card reading: "Dishwasher. An electric appliance that washes, rinses, sterilizes and dries your dishes. You will find an immense relief to be able to keep your hands out of the hot, greasy dishwater." At the other end of the display was an electric laundryette with a card reading: "Electric Laun-Dry-Ette. Clothes washed and dried in the same receptacle without a wringer." A drape of crimson velvet covered the floor, while several electric heaters bore cards reading: "Cheerful heat, at little cost, the Electric Way."

DEALERS MAKE MOST OF "HELPS" FOR WINDOW DISPLAYS.

Manufacturer's Assistance in Preparation of Windows and Stores for Fall Sales is Welcomed by Electrical Stores.

The electrical contractor-dealer frequently finds it profitable to give over an entire show window to a trim designed and supplied by the manufacturer of a special line, or of even a single device. Sometimes the window display will contain a few other appliances that may be related directed or indirectly to the use of the dominating feature of the display.

In the window displays illustrated herewith a certain make of attachment plug predominates. The view in the center shows the display window of the Gem City Electric Co., Quincy, Ill., in which the trim is made up entirely of the attachment plugs, emphasized with tasty showcards. The views on either side show the mingling of a few appliances and lamps, the use of which are made more convenient by the employment of this particular attachment plug. The view on the left shows a window of the Robert Gibson electric store in which the relationship between the plug and the use of portable lamps, flatirons and some other appliances is shown. The window on the right, dressed by the Robertson-Cataract Co., Buffalo, N. Y., shows the application of the plug in the use of electric fans.



Plans for These Window Displays Were Furnished by the Manufacturer of the Attachment Plug Which Dominates Each Display, for Use of Dealers During a Sales Campaign.

NEW APPLIANCES

Newly Developed and Improved Electrical and Mechanical Apparatus, Appliances, and Devices Now Being Placed on the Market

Self-Contained Motor-Driven Tool Grinder.

Ease of starting and total inclosure of motor and control apparatus are the outstanding features of the motor-driven tool grinder just placed upon the market by the U.S. Tool Co., Cincinnati, O. The grinder shown in the accompanying illustration is equipped with a 5-hp., shunt-wound, adjustable-speed (1120 to 1600 r. p. m.) 230-volt, d-c.

Tool Grinder With Motor and Control Apparatus Totally Inclosed.

Westinghouse motor and is started or stopped by a push button on the top of the motor frame. This push button actuates a type C Westinghouse starter with a speed-adjusting rheostat, both being located in the bottom of the machine frame.

The reason for mounting the push button on the top of the motor frame is interesting. On previous machines of about the same type these push-button stations were mounted directly in front of the motor frame, but it was found that the workmen in using these grinders would start the motor by jabbing the button with the material which they intended to grind. With the new position for the buttons it is easier for the workmen to operate it with his hand than with the tool, thus naturally preventing misuse.

Automatic Water-Level Indicator.

A real aid to comfort and confidence in car operation is found in the new "Batometer," made by the Hempey-Cooper Manufacturing Co., Kansas City, Mo., and distributed by the Fairbanks Co., New York City. The "Batometer" is a device for indicating to the driver the water level in the battery. It consists of two instruments, mounted in a single case, which replace the standard ammeter furnished on all electrically equipped cars. One instrument is a charge and discharge ammeter of the usual type and the other is an indicator of the electrolyte level. The ammeter is connected in the regular manner. The "Batometer" is connected by flexible wires to two lead electrodes mounted in caps which replace the filling caps of the two end cells of the battery. These electrodes project into the cell almost to the top of the plates. As the level of the electrolyte falls, the electrodes are uncovered, and when it falls below the tip of one or both electrodes the needle swings widely to "low water."

The "Batometer" will also warn of an overdischarged condition in the following manner: If the needle reads "low water" and yet an inspection of the cells shows that there is enough electrolyte, the battery is overdischarged. Thus, this instrument will give warning of the most common causes of trouble before any damage can result, and as these warnings are immediately under the driver's eye they cannot escape his attention.

Refrigerating Unit for Home Use.

The Balsa Refrigerator Corp, 149 West 39th street, New York City, successor to the Frigidor Corp., is marketing a self-contained refrigerator unit for home use, known as the "Frigidor."

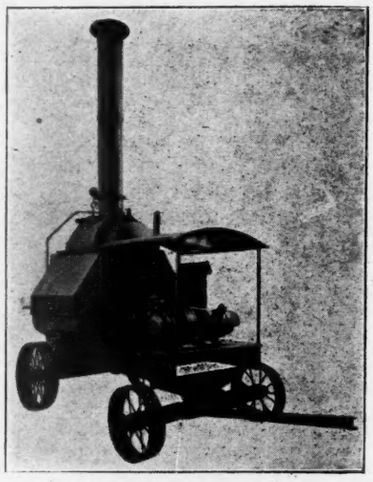
Electric Candlestick for Christmas Trees.

A novel device for enhancing the effect of electric lamps on Christmas trees has been placed on the market by the Leland Manufacturing Co., 139 North Clark street, Chicago. It consists of a candlestick provided with a reflector pan on the bottom, which produces the old-fashioned candle effect. To wire the candlestick the socket of the Christmas tree lamp is inserted from the bottom and the bulb is screwed in so as to come flush with the candle top.

Electric Christmas-Tree Light That Looks Like a Candle.

Portable Power Plant With Marine-Type Boiler.

The "Dynamobile" consists of a special type of Ludlum water-tube marine boiler, a steam turbogenerator unit, switchboard, boiler-feed pump, feedwater heater, condenser and, where the highest economy is sought, a superheater—all mounted on a steel frame carried on wheels. It is extremely simple in construction and operation, is free from vibration, and is practically fool-proof in construction, according to the claims made for it.



Portable Electric Power Plant.

The Ludlum marine boiler has gained acceptance in the marine world by virtue of its economy, simplicity and compactness. In the Dynamobile illustrated the boiler was designed to burn wood, the combustion chamber being unusually large. But the outfit can be furnished for burning any kind of fuel. The combustion chamber is entirely surrounded by the water-filled steam-generating parts of the boiler. This not only assuring high economy, but also does away with all fire-brick lining. The latter feature is of special value in a portable plant like this, as transportation over rough roads would break or dislodge a fire-brick furnace lining.

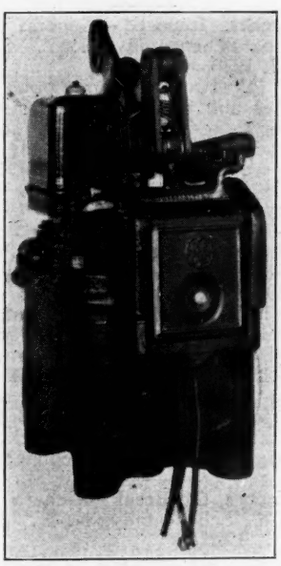
High efficiency, compactness and light weight of the boiler and turbogenerator set makes the Dynamobile a most desirable unit for portable power purposes, as it can be located near its source of fuel and its power is transmitted electrically to any reasonable distance with minimum loss. It is expected by the builders that this new high-duty portable plant will supplant the European outfits, known as "Locomobiles," extensively used in foreign countries. The weight of the "Dyna-

mobile" is only about one-third that of the "Locomobile" and its efficiency is even higher than that of the European unit. The outfit illustrated is of 10-kw. capacity. Larger units up to 200 kw. are furnished either for a-c. or d-c. service.

This new mobile power unit was designed and built by the New York Engineering Co., 2 Rector street, New York City, for driving the small portable conveyors used in certain classes of mining in South Africa. Previously, power for this purpose was furnished by reciprocating engines and portable boilers with belt and pulley transmission to the conveyors.

Solenoids for Operation of Oil Circuit-Breakers.

A solenoid mechanism which possesses several improved features has recently been developed by the General Electric Co., Schenectady, N. Y., for opertaing oil circuit-breakers. In accordance with a policy of standardizing apparatus, this solenoid is made up of standard, mutually interchangeable units, which facilitates repairing by the quick replacement of parts. It provides facilities for mounting auxiliary switches such as may be required by the different kinds of service to be rendered.



Type SD Solenoid Mechanism for Use With Circuit-Breaker.

An example of such auxiliary devices is the attachment of a multiple-unit rotary switch to function in various ways, one of which is to control red and green pilot lights serving as an indication as to whether the breaker is open or closed. The outdoor-type solenoid is completely inclosed in a metal case which may be locked shut to prevent unauthorized tampering with the breaker. For emergency operation a detachable operating handle is furnished. The construction of the mechanism is of a most rugged type, special attention being given to simplicity and reliability of operation. A further improvement is that connections are brought to a terminal board located on the front part of the mechanism base, making them easily accessible for inspection or installation purposes.

Plug Fuse With Zinc Cap.

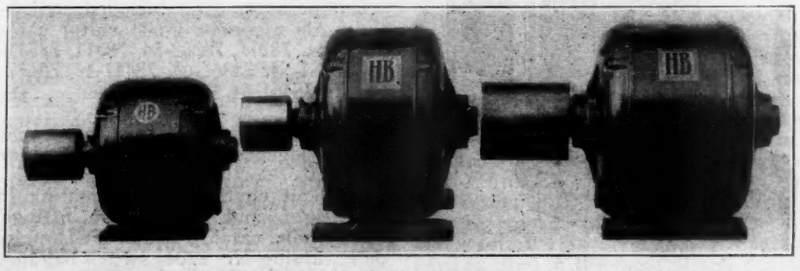
A plug fuse equipped with a zinc cap to avoid the use of brass or aluminum has been developed by the Killark Electric Manufacturing Co., 3940 Easton avenue, St. Louis. Contact is made between the friable element and the shell in the porcelain.

Ball-Bearing Motors of Medium Capacity.

In accordance with an announcement made some time ago, the Hobart Brothers Co., Troy, O., have entered upon a program of increased production. One new line of manufacture taken up includes a series of ball-bearing motors in six sizes of from one to ten horse-power and for both alternating and direct current. These new motors are said to be fully up to the standards established by this company in the manufacture of other electrical equipment, such as battery-charging sets generators, etc. The production of this new line will not interfere in any way with other equipment made by this concern.

The revolving parts of the a-c. motor consist of a rotor, built of laminations, into which a number of bars are inserted, being forced into a milled end ring of copper. The rotor is all metal, with no insulation to be injured by an overload, and no sliding contacts or commutator. The stator is built of thin steel laminations into which are placed form-wound coils. This stator is thoroughly impregnated with insulating compound and pressed into an accurately machined cast-iron housing.

Motors for d-c. service are built with laminated sheet-steel pole pieces riveted together. The armatures are wound with thoroughly insulated formed coils, firmly held in place with steel band wire. The commutators are built up of hard-drawn copper bars with enough copper for long service without renewal. Brush holders are of the manufacturer's special box type, broached to give accurate fit to the brushes. Correct pressure is secured by adjustable springs. These motors are furnished complete with base, tracks and pulley, compensators being furnished with the 7.5 and 10-hp. motors. The smaller sizes are thrown directly on the line, no starter being required.

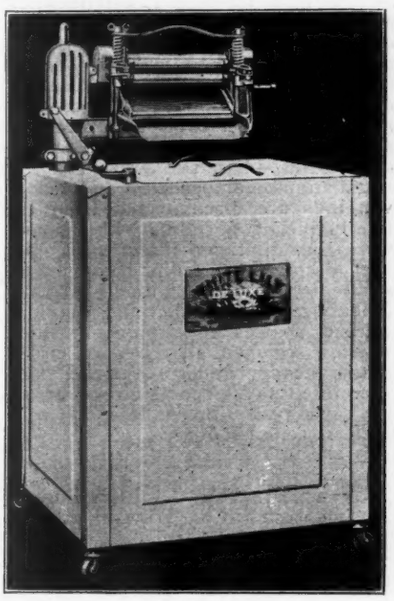


Three of the Ball-Bearing Motors Made by Hobart Brothers Co.

Full-Cabinet Electric Washing Machine.

The electric washing machine developed by the White Lily Manufacturing Co., Davenport, Ia., has a number of features of distinctive advantage. Full-cabinet construction, inclosing all working parts, makes the machine particularly safe for use where small children are apt to be playing in the laundry. There are no projections from the straight side of the cabinet to interfere with the harmonious appearance of the finish. Working parts may be inspected, cleaned or oiled by removing the side panels which fit into grooves in the frame. Large, easy-running castors make the machine easy to move about from place to place, and the white-enamel finish make it particularly easy to clean.

This machine, known as the "White Lily De Luxe," is a cylinder-type washer—the cylinder reversing after each complete revolution. This style of operation is said to eliminate the rolling and wadding of the clothes and to wash with a minimum of wear. Fine laces and heavy blankets may be washed with the same efficiency.



"White Lily De Luxe" Electric Washing Machine.

The cylinder is made of hard maple which wears smooth and is easy to clean. Washing efficiency is improved by grooves on the inside of the cylinder. Brass bindings hold the cylinder strips firmly in place, this being one of the special features of the machine. With the exception of the cylinder in which the clothes are washed, the "White Lily De Luxe" is an all-metal washer. The metal frame will maintain its correct alignment and thus insure perfect operation of all moving parts. The wringer is equipped with 12-in. rolls with safety guards on both sides to keep the operator's fingers away from the rolls. It operates in either direction and can be locked in any desired position. The operating controls are always on the side on which the operator is standing and therefore within easy access at all times.

LATEST APPROVED APPLIANCES

Approved by Underwriters' Laboratories, Following Examination and Tests Conducted Under the Standards of the National Electrical Code

Attachment Plugs, Fuseless.—Benjamin Electric Manufacturing Co., 120 South Sangamon street, Chicago. Listed Sept. 3, 1920.

"Benjamin" separable and non-separable porcelain or composition attachment plugs; 660 watts, 250 volts; "Convert-A-Cap"; catalog Nos. 937, 940 and 1000.

Automobile Starters. — Western Electric Co., 195 Broadway, New York City. Listed Aug. 24, 1920.

Manually operated, oil-immersed switch and air-cooled compensator mounted as a unit in metal case, with or without overload and low-voltage release coils. Automatically controlled contractors and air-cooled compensators mounted as a unit in metal case, with overload protection and low-voltage protection or release coils; with 2-phase and 3-phase, 3-wire installations, compensator and motor windings are disconnected from the line in the off position; with 2-phase, 4-wire installations, three wires only are disconnected from compensator and motor windings; with 2-phase and 3-phase, 3-wire installations, overload release devices in running position operate to open all wires of circuit automatically under overload and, therefore, may serve as circuit breaker; capacity 250 hp. or less, 600 volts or less; type CR-7052.

Circuit Breakers. — Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Listed Aug. 24, 1920.

Single and multi-pole automatic circuit breakers for protection of low-potential circuits; "C-H"; 525 amperes or less, 600 volts or less; types D, F-1 and F-2.

Elevator Control Appliances.—Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Listed Aug. 24, 1920.

Floor stop device; bulletin No. 10331.

Heating Appliances, Industrial and Laboratory—American Electrical Heater Co., Woodward, Burroughs and Cass avenues, Detroit. Listed Aug. 3, 1920.

For voltages up to 250. Glue pots, 500-650 watts; catalog Nos. 181 and 182; laboratory plates, 800-4300 watts; catalog Nos. 2720, 2730, 2740, 2750, 2770 and 2790; "American Beauty" soldering iron, 100-300 watts, 250 volts or less; catalog Nos. 3158 and 3178; "American Beauty" disc stoves, 1000-1800 watts, 250 volts or less; catalog Nos. 3240, 3245 and 3250.

Raceway Fittings, Metal.—National Metal Molding Co., Fulton building, Pittsburgh. Listed Aug. 24, 1920.

Fittings for use with "National" metal raceways; fixture boxes, catalog Nos. 410 and 410-A.

Fittings, Fixture—Electrical Dealers Supply House, 162 West Randolph street, Chicago. Listed Aug. 6, 1920.

Insulating support for chain fixtures.

Fuses, Plug—Killark Electric Manufacturing Co., 3940 Easton avenue, St. Louis. Listed Aug. 13, 1920.

"Killark" Plug Fuse.

Edison plug fuses; "Killark," 0-30 amperes, 125 volts.

Resistance Appliances. — Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Listed Aug. 24, 1920.

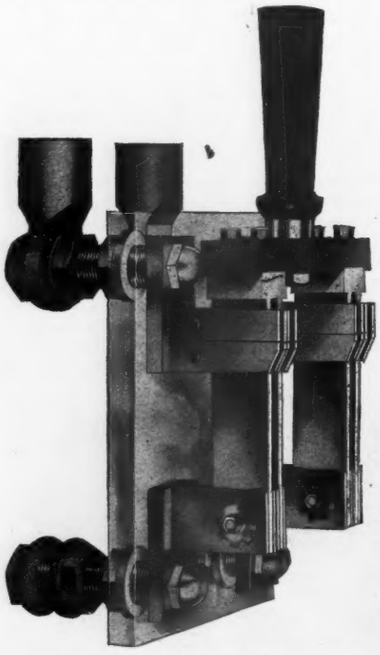
"C-H" pressure-controlled speed regulators; controllers, bulletin Nos. 5105 and 10013; self-starters, bulletin Nos. 7041, 7301, 7331, 9776, 9841 and 9871.

Resistance Appliances. — Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Listed Aug. 25, 1920.

"C-H." self-starters; bulletin No. 9601.

Switches, Knife—The Electrical Manufacturing Co., 4149 East 79th street, Cleveland. Listed Aug. 3, 1920.

"E. M. Co.;" all standard ratings; Type A. knife switches.



"E. M. Co." Type A Knife Switch

Sockets, Medium Base—Levitor Manufacturing Co., 136 Bowery, New York City. Listed Aug. 3, 1920.

"Leviton" metal-shell, medium base, pull sockets.

Switches, Inclosed—Standard Electrical Construction Co., 60 Natoma street, San Francisco. Listed Aug. 13, 1920.

"Standard" two or three-pole, with or without fuse extensions mounted in labeled sheet-metal cutout boxes and provided with handles for manual operation without opening cases; 60-200 amperes, 250 volts.

Switches, Inclosed.—General Electric Co., Schenectady, N. Y. Listed Sept. 7, 1920.

"G. E." two and three-pole knife switches and cutout bases for standard cartridge-inclosed fuses; inclosed in metal cases and designed for manual operation without opening cases; 30, 60 and 100 amperes, 500 volts, a-c.; type LM-5.

Switches, Knife.—General Electric Co., Schenectady, N. Y. Listed Sept. 7, 1920.

"G. E." knife switches; 30 amperes, 125 volts; catalog Nos. 42422-25 and 42688-89; all standard 250-volt ratings; type LD-22 back connected; type LD-23 front connected; also switch stops for this type; all standard 600-volt ratings; type QC-3 back connected; type QC-4 front connected.

Switches, Oil-Break.—General Electric Co., Schenectady, N. Y. Listed Sept. 7, 1920.

"G. E." oil-immersed switches; also conduit boxes for use with types FP-10 and FK-20.

Switches, Inclosed.—Meyers Electric Safety Switch Co., 247 Minna street, San Francisco. Listed June 8, 1920.

Standard fuse switches, mounted in standard and labeled, sheet-metal cutout boxes or cabinets; provided with external handles for manual operation without opening cases; 250 volts d-c., 500 volts a-c. or less, 400 amperes or less; Type C. catalog Nos. 601, 602, 701-15, 801-15, 901-15, 1001-15, 1101-15 and 1201-15.

Switches, Inclosed.—Square D Co., Detroit, Mich. Listed May 25, 1920.

Compensator type inclosed switches; 0-200 amperes, 0-600 volts; catalog Nos. 78211, 78252-54, 78311, 78341-44, 78351-54, 78361-64, 78441-44, 78451-54 and 78461-64.

Switches, Surface—Bryant Electric Co., Bridgeport, Conn. Listed June 15, 1920.

Without covers. For mounting in watertight and vaporproof fittings. Single-pole, catalog No. 2705; Double-pole, catalog No. 2704; switch handles, catalog Nos. 589-90.

ACTIVITIES IN THE TRADE

Business Developments, Sales Agencies, Trade Literature and Miscellaneous Items Concerning Electrical Manufacturers and Allied Business Interests

Hale Electric Co., Cleveland, plans to erect a plant at Massillon, O., for the manufacture of electric heating equipment for houses.

Gould Electric Co., Presque Isle, Me., has construction under way on a two-story and basement building, 45 by 60 ft., to cost about $35,000.

Electric Furnace Co., Alliance O., has issued a booklet which illustrates and describes the Baily electric furnace for heat-treating and annealing purposes.

Modern Electric Co., Bridgeport, Conn., is planning the removal of its establishment to new quarters at Broad and Cannon streets, for increased operations.

Consolidated Electric Lamp Co., a Maine corporation, has filed authorization to operate in New York state. E. D. Tolles, 52 Broadway, New York City, is representative.

Live Wire Electrical Appliances Co., 181 Griffith street, Jersey City, N. J., has filed notice of organization to manufacture electrical devices. Edward Mahlen heads the company.

Peerless Insulated Wire & Cable Co., Pennington, N. J., has commenced the erection of an addition to its plant, to be used for the manufacture of weatherproof wire products.

Chelsea Elevator Co. has removed its plant from 213 West 26th street to 439-41 West 19th street, New York City, where larger quarters for increased manufacture will be provided.

McIntosh Battery & Optical Co., 217 North Desplaines street, Chicago, plans to erect a one and two-story plant, 120 by 125 ft., at 223-233 North California avenue, at an estimated cost of $45,000.

Edison Storage Battery Co., West Orange, N. J., has filed notice of corporation change under New Jersey laws, with G. E. Cole, 23 West Forty-third street, New York City, as corporate representative.

Blaw-Knox Co., Pittsburgh, has established a district office in Birmingham, Ala., which makes eight district offices in all, viz., New York, Chicago, Boston, Detroit, Baltimore, San Francisco and Sheffield, Eng.

Waterbury Electric Co., 692 Main street, Waterbury, Conn., has leased property at 262 North Main street, and will remove its establishment to this location. Improvements will be made in the building prior to occupancy.

American Engineering Co., Philadelphia, manufacturer of Taylor underfeed stokers, has issued in book form a story by Talbot Stover entitled "What of It, J. T.?" which describes, in narrative form, the difficulties of a textile-mill superintendent in trying to convince the general manager of the increased output that can be obtained in the boiler room by use of stokers.

Eastern Electrical Supply Co., 798 Broad street, Newark, N. J., has acquired the three-story and basement building, 47 by 90 ft., at 88-90 Academy street, extending through to Plane street, for the establishment of a new plant.

Sprague Electric Works of General Electric Co., Bloomfield, N. J., held a banquet for department heads at Achtel-Stetter's restaurant, Newark, N. J., Oct. 7. Charles D. Knight, plant manager, and C. F. Scott and F. W. Hall of the New York office spoke on the occasion.

Majestic Electric Development Co., 656 Howard street, San Francisco, has recently distributed a circular to the building and electrical trades describing and illustrating the "Majestic" electric heaters for the home. Some of the advantages claimed for this type of heater are clean, steady, troubleless, safe, fumeless and economical heat.

Conveyors Corp. of America, 326 West Madison street, Chicago, has distributed a circular containing an imprint of an article entitled, "Removing Boiler and Stack Soot with a Steam Jet," which appeared in the June 19, 1920, issue of ELECTRICAL REVIEW. The article in question describes the construction and operation of the steam jet conveyor as used in many leading central stations.

Norton, Bird & Whitman, engineers, 501 Fifth avenue, New York City, have made an announcement that they are prepared to make cost analyses for central station companies and other public utilities with the view of showing to the various public service commissions the actual rate of return on each rate embodied in the schedules. Such data can be utilized in making application for an increase in rates.

General Electric Co., Schenectady, N. Y., has acquired a controlling interest in the X-ray business of the Victor Electric Corp., 236 South Robey street, Chicago, and a new company known as the Victor X-Ray Corp. has been organized, with offices and manufacturing plant in Chicago. C. F. Samms, president of the old Victor firm, becomes president of the new company, and Dr. Coolidge, inventor of the General Electric Co.'s X-ray tube, will be consulting engineer. Capital stock of the new company has been exchanged for General Electric X-ray patents and good will, and for the assets of the old Victor Electric Corp. The formation of the new company will result in full manufacturing, engineering and research co-operation between the General Electric Co. and the Victor X-Ray Corp. In 1914 the General Electric Co. placed the Coolidge X-ray tube on the market and will continue to manufacture this invention and other devices used in the medical and dental professions.

Gould Storage Battery Co., 30 East 42nd street, New York City, is offering prizes amounting to $4000 for the oldest Gould automobile storage batteries in the country. The company intends to back up its claims for Gould automobile batteries with records made under actual working conditions on the road.

Habirshaw Electric Cable Co., New York City, has published a book of suggestions and data for the prospective home-builder, entitled "The Home Electrical." It contains plans showing the location and type of electrical outlets, together with illustrations of typical electrical equipment, appliances and devices for the laundry, kitchen, bedroom and other home uses. The appliances shown are selected from the extensive line of the Western Electric Co. A section of the book is devoted to a description of Habirshaw and Western Electric products and service.

Duplex Lighting Works, 6 West 48th street, New York City, realizing the benefits to the public and the industry derived from the industrial lighting campaigns held in the past, has inaugurated a "Duplexalite" residence campaign which is most complete and should be of invaluable help to the contractor and dealer selling lighting fixtures. The company has prepared sales letters, postcards and descriptive folders, and offers without charge to print letterheads, imprint literature and mail the material for any dealer furnishing a list of 50 prospective customers and prepaying the 5-cent postage required by each. In addition, the release of these letters will be timed with "Duplexalite" national advertising publicity, so that the plan offers an opportunity for dealers to get new business at low cost.

Cutler-Hammer Manufacturing Co,, Milwaukee, has published a booklet bearing the title "Steel Mill Control," which tells briefly the story of iron and steel from the ore in the mine to the finished product of the steel mill, explaining how the Cutler-Hammer products have aided in making possible the great engineering progress in mining and ore handling, and in furnace and steel mill practice. The booklet is illustrated with C-H controls and other products, as well as views of their installation. Every machine peculiar to the steel industry is referred to with a discussion of the control to be used. One of the most ingenious devices shown is an automatic controller for the gas cock reversing mechanism for coke ovens. This apparatus operates under the direction of a self-winding master clock and at predetermined time intervals three different valve operations are performed in a definite sequence. About 40 other controls are described. Space is also given to electric brakes, lifting magnets, space heaters, Thomas meters for measuring gases and magnetic separator pulleys.

PERSONAL MENTION

Biographical Sketches and Chronicle of Changes in Business Connections, Promotions and Other Personal News of the Industry

BRITON O. SMITH has accepted a position on the staff of the DeLaval Steam Turbine Co., Trenton, N. J.

F. J. SILL has resigned his position as superintendent of distribution of the New England Power Co., Worcester, Mass.

R. NORMAN COKE, JR., has been appointed traffic engineer for the western division of the Bell Telephone Co., Toronto, Can.

J. H. KLINCK has accepted a position in the general sales department of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

W. R. GREENSHIELDS has been appointed assistant sales manager of the Canada Wire & Cable Co., Toronto, Ont., to succeed Major F. C. Connery, deceased.

NEWCOMB CARLETON, president of the Western Union Telegraph Co., New York City, has been elected a director of the American Sugar Refining Co.

PROF. D. C. JACKSON has been appointed chairman of the standards committee of the American Institute of Electrical Engineers to succeed L. T. Robinson.

CARL C. THOMAS has been appointed western representative of Dwight P. Robinson & Co., with headquarters in the Electric Equipment building, Los Angeles, Cal.

T. WALTER MCGRATH has severed his connection with the Electric Storage Battery Co., Philadelphia, and is now connected with the M. J. Dougherty Co., contractor.

HENRY BOWER has accepted a position as an auditor with the General Electric Co., Schenectady, N. Y. He was formerly with Landers, Frary & Clark, New Britain, Conn.

M. C. OSBORN has accepted a position as utility representative of the Gillespie Eden Corp., New York City. He was formerly sales manager of the Washington Water Power Co., Spokane.

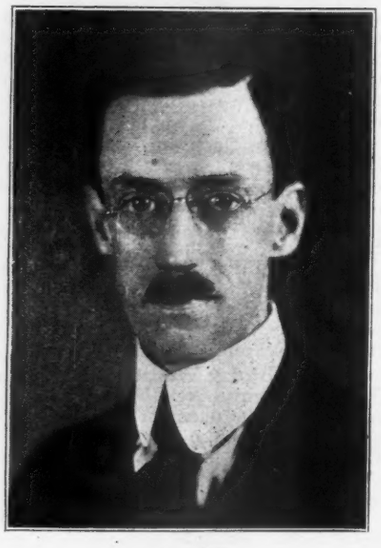
C. D. EMMONS, president of the United Railways & Electric Co., Baltimore, Md., was elected fourth vice-president of the American Electric Railway Association at its recent meeting at Atlantic City.

WALTER J. TIMMONS, who has been connected with the statistical and claim departments of the Commonwealth Edison Co., Chicago, since August, 1911, resigned recently to engage in the insurance business.

HENRY HERBERT COUZENS, chief engineer and manager of the Toronto Hydroelectric System, Toronto, Can., has been given an indefinite leave of absence to organize the work of the new transportation commission of the city of Toronto, of which commission he has been appointed manager. During Mr. Couzens' absence, Edward M. Ashworth, assistant manager of the Toronto Hydroelectric System, will act as general manager.

R. E. FISHER has been appointed a member of the commercial section to represent the Pacific Coast Geographic Division of the National Electric Light Association. He is commercial manager of the Pacific Gas & Electric Co., San Francisco.

H. W. HOUGH, for the past ten years chief electrical and research engineer for the Cleveland Electric Illuminating Co., on Oct. 1, joined the staff of the Daniel M. Luehrs Co., industrial consulting and construction engineers, Cleveland. Mr. Hough is an engineer of recognized standing in the central-station industry, having had 18 years' responsible participation in the diversified activities of large electric lighting



H. W. Hough.

and electric railway interests. His experience in the design of modern power houses, substations, transmission and distribution systems has, therefore, been acquired under circumstances which insure a high standard of judgment in this class of engineering work. Mr. Hough has also been actively engaged for a number of years in the solution of the many industrial problems which are incident to the supply of light and power. In this connection his experience in industrial applications has been extensive, particularly as applied to large electric furnaces, rotating electrical machinery of many types, and electric welding and heating devices. He has been closely associated with prominent engineers throughout the country in his work on various committees of state and national engineering societies.

WILLIAM F. STROUSE has been appointed chief engineer of the Maryland Public Service Commission, Annapolis, Md., to succeed the late Charles G. Edwards. Mr. Strouse has been acting chief engineer for the past six months.

E. A. BROFOS, who has been representing the Western Electric Co. in Northern Europe for several years, has been appointed manager of a new Norwegian corporation which will handle the Scandinavian business of the International Western Electric Co. Mr. Brofos will make his headquarters in Christiania, Norway.

COL. W. R. THOMPSON, who has been appointed assistant manager of the Shaffer Oil & Refining Co., has been connected with the H. M. Byllesby & Co. organization for 11 years, having started in 1909 as assistant chief engineer. A few years later he became manager of engineering and construction, and while in this position he had charge of the construction of many of the company's most important hydroelectric developments, including the Coon Rapids water power project near Minneapolis, Minn. He was also responsible for the development of the wishbone type of crossarm for long-distance transmission of electrical energy, and was the directing head of many of the company's largest steam-power constructions.

OBITUARY.

S. C. GREEN, a prominent electrical engineer of the Southwest, died recently in Dallas, Tex. He was the founder and head of the Green Electric Co., Dallas, and designed and erected many of the electric light plants in Oklahoma and Texas.

ELVIN L. MCGREW, general traffic manager and purchasing agent of the Standard Underground Cable Co., Pittsburgh, died in New York City, Oct. 8, at the age of 55 years. He had been with the Standard company since 1900, and was a director as well as the first president of the Purchasing Agents' Association of Pittsburgh.

WILLIAM MCFAUL died recently at Mount Vernon, N. Y., aged 78 years. He was a prominent figure in the compressed air machinery field, being one of the proprietors of the Freeland Tool Works, which built some of the first compressors for the Rand Drill Co. The Freeland business was later sold to the Rand Drill Co., with which Mr. McFaul was connected for some time, and afterwards with the Ingersoll-Rand Co.

FRANK W. HARRINGTON, well-known electrical supply salesman, died Oct. 3, in Greenfield, Mass., where he was undergoing treatment for throat trouble. He was 72 years old and for over 20 years had been associated with John A. Roebling's Sons Co. From the very beginning of his career Mr. Harrington had always been connected with the telephone and telegraph fields, being one of the pioneer telephone men of the country. About a year ago ill-health compelled him to give up his business activities, and he removed from New York City to Athol, Mass. Mr. Harrington was a Mason, a member of the Sons of Jove and the Oldtimers Club. He is survived by a widow and married daughter.

BUSINESS OPPORTUNITIES

News of Electrical Construction Projects in All Parts of the Country, Proposals Invited, Foreign Trade Openings and New Companies

EASTERN STATES.

Nashua, N. H.—The Nashua Manufacturing Co. has commenced work on extensions and improvements in the power house at its blanket mills.

Boston, Mass.—Commissioner of Public Works T. F. Sullivan has awarded a contract to the Westinghouse Electric & Manufacturing Co., Pittsburgh, for equipment for two new electrically operated pumping plants for high pressure water service for the fire department, at a cost of $174,569. One of the stations will be located at the power plant of the Boston Elevated railroad, Commercial street, and the other at the plant of the Edison Electric Illuminating Co., Atlantic avenue.

Danvers, Mass.—The Commission of Mental Diseases, 36 State House, Boston, plans to erect a one-story power plant at the state hospital located at Danvers. The estimated cost is $250,000.

Everett, Mass.—The Malden Electric Co., Malden, Mass., will hold in abeyance plans for the erection of its new one-story electric substation on Broadway, Everett.

Fall River, Mass.—In connection with the erection of an addition to its plant to cost about $200,000, the Lincoln Manufacturing Co., Jefferson street, manufacturer of cotton goods, will install a new electrical department, including switchboard room. The new plant buildings will be one and three-story, 122 by 157 ft., and 32 by 47 ft., respectively.

Fall River, Mass.—The New England Oil Corp., New street, has filed plans for the erection of a number of pumping plants, including main pump house, condenser building and other auxiliary units.

Fitchburg, Mass.—The Fitchburg Gas & Electric Light Co., 537 Main street, has awarded a contract to Wiley & Foss, Central street, for the erection of a boiler plant, machine shop, service building and other mechanical works on the Sawyer Passageway. The structure will be two and three-story, 58 by 150 ft., and is estimated to cost $125,000.

New Bedford, Mass.—The Kempton Electric Service Co. has been organized to operate a plant at 270 Kempton street. Milton A. Doolittle, 197 Middle street, heads the company.

North Adams, Mass.—The Boston & Maine railroad has awarded a contract to the Fred T. Ley Co., Springfield, Mass., for replacing the overhead trolley system in its electric zone in this district.

Worcester, Mass.—The Compton & Knowles Loom Works have filed plans for extensions and improvements in the transformer building at their textile machinery plant.

Waterbury, Conn.—The Waterbury Rolling Mills, Aurora street, have filed plans for the erection of a transformer building at its works, about 20 by 26 ft.

Buffalo, N. Y.—The Buffalo City Service Co., recently organized, is planning the establishment of a local electric plant, with distributing system in certain sections of this district. The company is headed by Robert C. Davidson, George W. Wheeler and T. Craig Burns.

Buffalo, N. Y.—The Phoenix Beverage Co., 835 Washington street, has awarded a contract to George Kempf's Sons, 821 Virginia street, for the erection of a one-story addition to its power house, 30 by 50 ft., to cost about $15,000.

Jamestown, N. Y.—The Dahlstrom Metallic Door Co. plans to install a 300-hp. synchronous motor-generator set. Address J. A. Westman, general manager.

New York, N. Y.—The Public Works Department has entered into an agreement with the Staten Island Midland Railway Co., for a leasing of its lines in Richmond Borough, and the operation of the property as a municipal enterprise. A five-cent fare will be charged. The agreement provides that the Richmond Light & Power Co., which has been furnishing electric energy for the operation of the system, shall continue to do so at cost; this latter will be determined by an expert for the city and one representing the company.

Rensselaer, N. Y.—Electrical and mechanical equipment will be installed in the ice cream manufacturing plant to be erected by C. P. Stevens, 120 South Swan street, at 126-8 Jay street, to be three-story, 50 by 70 ft., and estimated to cost $30,000.

Rock City Falls, N. Y.—The power house at the plant of the Hercules Paper Mill was partially destroyed by fire on Oct. 7.

Syracuse, N. Y.—The power house at the University of Syracuse was damaged by fire on Oct. 11.

Utica, N. Y.—The State Hospital Commission, Albany, has awarded a contract to Scott Brothers, Arlington block, Rome, N. Y., for the erection of an electrically operated pumping plant and filtration works at the Utica State Hospital at a cost of $164,666.

Vernon, N. Y.—The Tyler Light & Power Co. has filed notice of dissolution under New York laws.

Yonkers, N. Y.—The National Sugar Refining Co., 129 Front street, New York City, has awarded a contract to the William L. Crow Construction Co., 103 Park avenue, New York City, for the erection of an addition to its power house on Main street.

Atlantic City, N. J.—In connection with the application of the Atlantic City Electric Co. for permission to build a new high-tension line to the station of the United States Radio Supply Co., Tuckerton, the board of freeholders does not look upon the project with favor, holding that the lines will be a menace on public highways. It is urged that the company purchase a private right-of-way for the system, and the matter is still pending.

Bayonne, N. J.—The Texas Co. has filed plans for the erection of a one-story power house at its oil works, foot of First street, to cost about $13,500.

Orange, N. J.—Considerable electrical and mechanical equipment will be installed in the new plant addition at the factory of the Monroe Calculating Machine Co., 49 Mitchell street. The structure will be four stories, and is estimated to cost $200,000.

Paterson, N. J.—The Silk Realty Co., Twelfth avenue, has construction under way on a one-story power house addition to cost about $14,000.

Trenton, N. J.—A large electric power plant for works service will be erected by the Mutual Potteries Co., Trenton, at its new sanitary ware plant on Clinton avenue, estimated to cost close to $1,000,000. The contract has been let to Stone & Webster, Inc., 120 Broadway, New York City, for the construction work.

Allentown, Pa.—The only bid submitted to the city council for the installation of a new steam turbine, electrically operated contrifugal pumping unit at the city waterworks was from the Dravo-Doyle Co., Philadelphia, at a price of $75,980.

Allentown, Pa.—The Allen Tire & Rubber Co., 510 Hamilton street, is arranging for the installation of equipment at its power house in the Bachman terrace section.

Lansdale, Pa.—A company is being organized to raise $50,000 for additional equipment at the municipal electric light plant. Address clerk of the borough council.

New Bethlehem, Pa.—Considerable electrical and mechanical equipment will be installed at the new mining plant of the Pine Run Coal Co., estimated to cost about $200,000. The H. K. Ferguson Co., 6525 Euclid avenue, Cleveland, is contractor.

Newcastle, Pa.—The city has filed a complaint with the Public Service Commission against the Manufacturers' Light & Power Co., asking for improvements and betterments in the local service.

Philadelphia, Pa.—The Bell Telephone Co. has construction under way on a new three-story and basement building at Broad and Rockland streets, Wyoming district, 90 by 137 ft., to cost about $400,000.

Philadelphia, Pa.—The Department of Public Works, City Hall, has taken bids for the erection of a one-

story pumping plant at the Queen Lane pumping station, used by the waterworks department.

Philadelphia, Pa.—The Carver File Co., 3231 Frankford avenue, has commenced the erection of a power house at Tacony and Buchins streets.

Philadelphia, Pa.—William Steele & Sons have been awarded a contract to erect a power house for the Reyburna Manufacturing Co.

Pittsburgh, Pa.—The Public Service Commission has ordered the Duquesne Light Co. to install additional lamps on Jefferson road, Penn township, sustaining a complaint of the local officials against the company for inadequate service.

Pittsburgh, Pa.—The Pittsburgh Street Railways Co., Chamber of Commerce building, has completed plans for alterations and extensions in its power plant on Brunots Island.

Stewartstown, Pa. — The power plant of the Deer Creek Water & Power Co. was destroyed by fire on Oct. 6.

Williamsport, Pa.—The Lycoming Foundry & Machine Co., Oliver street, has completed plans for the erection of a one-story power house addition, 50 to 100 ft., to cost about $30,000.

York, Pa.—Fire Oct. 11 damaged the transformer building at the plant of the York Haven Water & Power Co. Service was interrupted for a number of hours at neighboring places served by the company.

Baltimore, Md.—The Standard Oil Co. has filed plans for the construction of a one-story transformer house at its oil works on Eighth street.

Baltimore, Md. — The Columbia Graphophone Co. has filed plans for the erection of the proposed pumping plant at its works at Loneys lane and Chase street, one-story and basement, 38 by 62 ft., and estimated to cost $25,000.

Baltimore, Md.—The Consolidated Gas, Electric Light & Power Co., Lexington building, is said to be planning for a bond issue of $5,000,000, to be used in part for power plant and line construction in this district. The company has plans well under way for the erection of a power plant on East Madison street.

Cumberland, Md.—The Edison Electric Illuminating Co. has completed the installation of a lighting system at Ridgeley, W. Va., on the opposite side of the Potomac river, and service has been inaugurated.

Frederick, Md.—The city council has awarded a contract to the G. W. Cornell Co., Pittsburgh, for improvements in its electric system, including the installation of new equipment at the electric lighting plant, and betterments in the street-lighting system, to cost about $41,400.

Washington, D. C.—The Potomac Electric Power Co. is arranging for a loan of $600,000, the proceeds to be used for extensions and improvements in its power plants and system.

Bristol, Va.—Electrical equipment, including industrial motors, lighting, etc., will be installed in the four local shop buildings to be constructed by the Norfolk & Western railroad, Roanoke, Va., for locomotive and car repair work. The shops are estimated to cost $50,000.

Harrisonburg, Va.—The West Harrisonburg Light Co., recently incorporated, will operate a light and power system in this district. H. A. Logan is president, and J. S. Flory, secretary.

Marion, Va.—The Mt. Carmel Light & Power Co., recently organized, will operate a light and power system here. W. A. Scott is president.

Roanoke, Va.—The Norfolk & Western Railroad Co. plans to erect an addition to its electric plant at Roanoke at an estimated cost of $300,000.

Scottsville, Va.—The Big Bend Power Co. has been organized by F. C. Moon and others to erect a plant on the James river.

Fairmont, W. Va.—Plans are being prepared for a transmission line for the Monongahela Valley Traction Co. Address R. W. Lohman, superintendent, Watson building.

New Holland, N. C.—Benham & Richards, 214 East State street, Columbus, O., city planners, will purchase the electrical machinery and equipment for the establishment of a light and power system at the property of the North Carolina Farms Co., New Holland. With certain sewer work, the project will cost about $50,000.

Red Springs, N. C.—The town council has arranged a bond issue of $50,000 for the installation of an electric lighting system, in connection with the waterworks.

Milner, Ga.—The city has voted bonds for light and power. Power is to come from Etheridge's mill, about two miles from town, where a recently constructed dam has been built on Potato creek.

Trion, Ga.—The Trion Co., Inc., plans to erect a one-story addition to its power plant.

Jacksonville, Fla.—The construction of an electric line to the state fair grounds has been authorized by the city commission. Address T. O. McBride, chairman.

NORTH CENTRAL STATES.

Cleveland, O.—The Allen Theater Enterprises of Toronto, Can., plans to erect a power plant at Euclid avenue and East 14th street, in connection with a new theater and commercial building.

Dayton, O.—A recent fire at the Miller's Ford electric light station of the Dayton Power & Light Co. caused a loss of $4000.

Huron, O.—Plans are under way to improve the municipal light and power plant. Address city clerk.

Youngstown, O.—The Youngstown Sheet & Tube Co. has received a federal permit to construct a high-tension transmission line over the Mahoning river at a point about 600 ft. below the highway bridge over that river at Struthers, O., half a mile below Youngstown and 15.5 miles above the mouth of the Mahoning river.

Holland, Mich.—Members of the Holland Merchants' Association believe that if the city is to go in for boulevard lighting at all some plant ought to be devised whereby Holland will get a real boulevard lighting system.

Albion, Mich.—The Michigan State Telephone Co. will place underground conduits for all telephone wires now on Superior street, between Austin avenue and Ash street. The company will expend $65,000 on improvements.

Wakefield, Mich.—The city purchasing agent has been authorized to buy two 5-kw. and two 3-kw. transformers. Address William Jacobson, city clerk.

Chicago, Ill.—The Charles G. Stevens Co. plans to erect a power plant in connection with its new warehouse on Western avenue and 45th place. The estimated cost of the project is $75,000.

Hudson, Wis.—Plans have been prepared by Holland, Ackerman & Holland, engineers, Monadnock block, Chicago, for hydroelectric plant No. 3 on Willow river near here. Owner, Burkhardt Milling & Electric Co., Burkhardt, Wis.

Lyons, Wis.—Plans are under way for organizing progressive clubs, with the object of making improvements to the street lighting system, etc.

Milwaukee, Wis.—Through William A. Read & Co., bankers, Nassau & Cedar streets, New York City, the Wisconsin Electric Power Co., Milwaukee, has arranged for a bond issue of $5,000,000, the proceeds to be used in part for the completion of its power plant now in course of construction. This station will have a capacity of 40,000 kw., and will be operated under lease by the Milwaukee Electric Railway & Light Co.

Princeton, Wis.—The Princeton Light & Power Co. will erect a hydroelectric power plant, plans for which have been prepared by the Jacobson Enginering Co., 533 Metropolitan Bank building, Minneapolis, Minn.

Rhinelander, Wis.—The Rhinelanded Light & Power Co. will extend its lines from Monica through Pelican Lake to Elcho.

Sheboygan, Wis.—Plans are being prepared for a four-story power house, 60 by 200 ft., to be erected by the Northern Furniture Co. at an estimated cost of $200,000.

Spooner, Wis.—Work will soon start on an ornamental "white way" lighting system to cost $2000. Address George B. Sage, city clerk.

Stevens Point, Wis.—The Chamber of Commerce will hold a meeting shortly to decide on installing a "white way" lighting system.

Verona, Wis.—A contract has been let to William Mueller & Co., Chicago, for wood poles for an electric light and power system for the Verona Light & Power Co. The estimated cost is $15,000. Wires, transformers, etc., have not yet been purchased. Address W. R. Hendricks, secretary.

Vesper, Wis.—The Wood County Rural Electric Co. will install an electric line from the Biron plant to Vesper, Arpin, Rudolph and Auburndale. Address W. W. Clark, secretary.

Albert Lea, Minn.—The Tri-State Telephone Co. has purchased a site at Newton and East Main street and

will build an exchange in the spring. The estimated cost is $35,000.

Duluth, Minn.—The city council has decided to build a telephone line between 34th avenue west and Lakeside. Address P. G. Phillips, commissioner.

Hibbing, Minn.—The water and light board has decided to install electric lights in the Home Acres addition. Address Charles Foster, superintendent of public utilities.

Iowa City, Ia.—Twenty Iowa City merchants may contribute $5000 each to a fund with which to start the erection of a $100,000 electric light and power plant for their downtown use.

Marshalltown, Ia.—The Marshall County Commissioners will establish electric lights on the county roads, power for which will be furnished by the Iowa Light & Railway Co., Cedar Rapids. Address George Enderly, county auditor.

Melrose, Ia.—The Melrose and Shiloh Electric Light & Power Co. has been organized to buy and sell electric energy and supplies and to erect and construct electric light and power transmission lines. L. A. Hoffa is president of the company.

Burlingame, Kan.—Plans are being prepared by Black & Veatch, engineers, 701 Mutual building, Kansas City, Mo., for a power plant to be erected by the city at a cost of $70,000.

Wellington, Kan.—Plans are being prepared by Johnson & Benham, engineers, Kansas City, Mo., for improvements to the electric light and water plant, including the installation of generator, turbine, etc. The estimated cost is $60,000.

Norfolk, Neb.—A special election will be held to vote on the question of issuing $300,000 worth of municipal electric light and gas plant bonds.

Rockford, Neb.—The Consolidated Electric Co. will build an electric line from Homlesville through Rockford and Filley to Virginia.

Sidney, Neb.—The city plans to remodel its power plant and install two 250-hp. boilers, generator, etc. Address I. G. Graybill, mayor.

Garretson, S. D.—The Garretson Electric Construction Co. has been awarded a contract for the building of a transmission line from Harrisburg to Tea and also for putting in the distributing system at Tea.

Kimball, S. D.—The Kimball Electric Light & Power Co. plans to install a 120-hp. oil engine.

Mitchell, S. D.—The present light, power and gas service is reported to be insufficient for the consumers' needs, and the city plans to establish a municipal plant which will produce the desired energy.

SOUTH CENTRAL STATES.

Harrodsburg, Ky.—Plans have been prepared by Pearse, Greeley & Hensen, engineers, Chicago, for the construction of an electric light plant and improvements to the waterworks. Bonds to the amount of $100.000 will be voted for the project on Nov. 22. Address J. G. Pullman, mayor, Harrodsburg.

Wasioto, Ky.—The Wasioto Light & Power Co. has been incorporated with a capital of $30,000, the incorporators being E. M. Bell and others. The company plans to install light and power equipment.

Fort Payne, Ala.—C. C. Appleton is planning the installation and operation of a local electric light and power plant.

Little Rock, Ark.—The city council is considering plans for extensions and improvements in the street-lighting system. John Bleidt is city electrician.

Litle Rock, Ark.—S. R. Morgan & Co. is planning the construction of a new transmission line to Cargile, Ark., connecting with the plant of the El Dorado Ice & Coal Co.

Sand Springs, Okla.—The Sand Springs Light, Heat & Power Co. is perfecting plans for the construction of its proposed high-tension line along the Arkansas river, extending from Sand Springs to Tulsa, about 10 miles. Charles Page is president.

Amarillo, Tex.—The City Light & Water Co. is making improvements and additions to its electric light and waterworks plant at a cost of $100,000. Considerable new equipment will be installed.

Jacksonville, Tex.—Fire on Oct. 10 destroyed the electric power and ice plant of the Commonwealth Light & Power Co., with loss estimated at $100,000, including equipment.

Laporte, Tex.—The electric light and waterworks plant of the Laporte Light, Water & Ice Co., which was recently destroyed by fire, will be rebuilt at a cost of about $20,000.

Memphis, Tex.—Fred Miller, Hollis, Okla., will erect an electric light and power plant here to replace that of the Texas Gas & Electric Co., which was destroyed by fire recently.

Moran, Tex.—The proposed power system to be constructed by the Albany Light & Stone Quarry Co., Albany, Tex., to Moran, is estimated to cost about $90,000, including a dam at Deep creek for waterworks service.

Rising Star, Tex.—The Rising Star Light & Power Co. has been incorporated here with a capital stock of $15,000. The incorporators are W. L. Felt, J. E. Lewis and J. R. Edison.

WESTERN STATES.

Colorado Springs, Colo.—The Alamo Hotel & Garage Co. has been granted permission to erect a power plant.

Phillipsburg, Mont.—H. H. Hanson, manager of the Drummond Light & Power Co., has completed plans for an electric lighting system.

American Falls, Ida.—Work will bgein next year on the American Falls dam. Address Eugene Banks, engineer.

Centralia, Wash.—The citizens have asked the city commissioners to install a cluster lighting system along Power avenue.

Hillsboro, Ore.—The Federal Telegraph Co. plans to erect a wireless station here at a cost of $200,000. Address F. H. Barstow, local manager.

Brawley, Cal.—The city plans to erect an electric light and power plant, for which purpose the citizens will vote on the issuance of $200,000 in bonds.

San Francisco, Cal.—Authority to proceed with the Pitt river hydroelectric power plant project, by which it is proposed to bring power to San Francisco at an eventual cost of $125,000,000 in building construction, was granted by the State Railroad Commission to the Mount Shasta Power Corp., a subsidiary of the Pacific Gas & Electric Co.

CANADA.

Winnipeg, Man.—Hydroelectric development in rural Manitoba is planed by the Canadian government, the estimated cost of the project being $1,000,000. Address J. M. Leamy, Provisional Power Commissioner.

Queenstown, Ont.—The city plans to install five generators of 55,000 hp. each, as well as other equipment in the hydroelectric power plant to be erected at a cost of $4,000,000.

INCORPORATIONS.

Boston, Mass.—The Brock Co., Inc. Capital $40,000. To manufacture electrical and other equipment. Incorporators: L. A. Marsh, Fred M. Hanson and William E. Ludden.

Hartford, Conn.—Electric Parts & Service Co. Capital $30,000. To manufacture electrical equipment for automobile use. Incorporators: C. H. Schrag, J. H. Miller and E. G. Reinert, 109 Ann street.

New York, N. Y.—The Harlem Battery & Ignition Co. Capital $5000. To manufacture electrical machinery and appliances. Incorporators: W. L. Greenfogel, O. V. Fleischman and M. Eckhaus, 398 Broadway.

New York, N. Y.—Pennsylvania Lighting Fixture Corp. Capital $10,000. To manufacture electrical fixtures. Incorporators: R. Berman, E. Wechsler and W. I. Stampleman, 2592 Creston avenue, Bronx.

New York, N. Y.—Federal Electric Safety Appliance Co. Capital $100,000. To manufacture electrically operated safety appliances. Incorporators: M. and W. Lyons, and K. Scherer, 317 East Fourteenth street.

PROPOSALS.

Cheyenne, Wyo.—Bids will be received Oct. 29 for the electric wiring of a new memorial hospital in Laramie county. Address Samuel Corson, secretary.

Melbourne, Australia—Bids will be received not later than noon on Feb. 24, 1921, by R. Liddelow, secretary of the Electricity Commissioners, 673 Bourke street, West, Melbourne, Victoria, Australia, for the supply, delivery, etc., of turbo-alternators and other equipment for the Morwell power project. Copies of tender forms, specifications, drawings and conditions may be inspected at the office of the Bureau of Foreign and Domestic Commerce, First National Bank building, Chicago, and 754 Custom House, New York City.

FINANCIAL NEWS

Comment on the Financial Outlook in the Electrical Industry, New Securities, Reports of Earnings, Dividends and Utility Stocks

New Investors Attracted tc Public Utilities Securities.

Marked improvement is being shown in the public utility securities market, according to the bond department of H. M. Byllesby & Co. Not only is the experienced and shrewd investor showing an appreciation for the present-day bargains in this class of security, but thousands of new investors are being attracted to this field every month. As an example, the Standard Gas & Electric Co. and its subsidiaries now have about 35,000 shareholders and, in addition, approximately 5000 investors are purchasing a partnership on the partial-payment plan. There is also a marked increase in the number of holders of the interest-bearing securities of the organization. This tendency will result in higher prices and lower yields for sound utility securities and the day is not far off when the present liberal returns will be a thing of the past on public utility issues.

Ottawa Light, Heat & Power Co. to Issue Trust Bonds.

The Ottawa Light, Heat & Power Co., Ltd., Ottawa, Canada, has called a meeting to consider the issue of not more than $6,000,000 of first mortgage and collateral trust bonds for general purposes and providing for the sale of certain water powers to the Ottawa Electric Co., and certain financial arrangements with the Ottawa Electric Co. and the Ottawa Gas Co.

Bond Offerings of Wisconsin Electric Power Co.

An issue of $5,000,000 Wisconsin Electric Power Co. first mortgage 7.5% sinking fund bonds, series "A," dated Oct. 15, 1920, and due Oct. 15, 1945, offered by William A. Read & Co. at 99 and interest, has been disposed of.

Allis-Chalmers Manufacturing Co.

Net profits for July and August were $595,532. For the eight months ended Aug. 30 last net profits were $2,195,163. Preferred and common dividend payments amounted to $1,390,545, leaving a surplus of $804,618. The previous surplus amounted to $10,856,007, making a total surplus on Aug. 31 of $11,660,625.

Philadelphia Co.'s Subsidiary.

	1920.	1919.
August gross	$ 902,134	$ 642,889
Net after taxes	417,071	112,622
Eight months' gross	10,043,874	8,441,565
Net after taxes	5,667,914	3,996,742

Tennessee Power Co.

	1920.	1919.
July gross	$ 211,225	$ 160,561
Net after taxes	86,925	66,720
Surplus after charges	33,409	12,721
Twelve months' gross	2,281,102	2,307,657
Net after taxes	925,495	885,528
Surplus after charges	282,414	243,733

Virginia Railway & Power Co.

	1920.	1919.
August gross	$ 922,490	$ 766,910
Net earnings	294,471	307,847
Total income	308,063	322,650
*Surplus after charges	110,540	138,997
Two months' gross	1,814,625	1,523,046
Net earnings	579,434	611,076
Total income	605,950	639,418
*Surplus after charges	209,790	275,599

*Before depreciation.

Northern States Power Co.

The gross and net earnings of the Northern States Power Co. for August and the year ended Aug. 31, 1920, compared with the corresponding previous periods, are reported as follows:

Month of August:	1920.	1919.
Gross earnings	$ 833.522	$ 707,847
Net earnings	245,885	287,804
Year ended Aug. 31:		
Gross earnings	10,915,215	9,365,060
Net earnings	4,322,771	4,023,187

The decrease shown for the month of August was due to increased coal costs which were offset beginning Sept. 1 by increased rates effective in many of the cities served. Telegraphic reports of September earnings show satisfactory gains over September, 1919.

Dayton Power & Light Co.

	1920.	1919.
August gross	$ 280,027	$ 208,924
Net after taxes	70,911	68,269
Total income	71,801	71,869
Surplus after charges	29,360	19,561
Balance after preferred dividends	11,793	3,103
Eight months' gross	2,348,170	1,823,550
Net after taxes	641,906	661,563
Total income	663,118	685,120
Surplus after charges	296,163	327,005
Balance after preferred dividends	157,700	200,724

Republic Railway & Light Co.

	1920.	1919.
August gross	$ 700,018	$ 522,812
Net after taxes	130,540	140,646
Total income	165,453	145,568
Surplus after charges	42,577	31,179
Twelve months' gross	7,590,484	5,867,562
Net after taxes	1,754,213	1,370,717
Total income	1,951,957	1,626,184
Surplus after charges	513,953	279,672

General Gas & Electric Co.'s Subsidiary.

	1920.	1919.
August gross	$ 985,177	$ 787,174
Net after taxes	187,533	235,706
Twelve months' gross	10,470,177	8,623,434
Net after taxes	2,444,565	2,475,524

Dividends.

The Edison Electric Illuminating Co. of Boston has declared its regular quarterly stock dividend of 3%, payable Nov. 1 to stockholders of record Oct. 15.

The Lowell Electric Light Corp. has declared its regular quarterly stock dividend of $2.50, payable Nov. 1 to stockholders of record Oct. 15.

The Electric Bond & Share Co. has declared its regular quarterly dividend of 2% on the common stock, payable Oct. 15 to stockholders of record Oct. 14; also 1.5% on the preferred stock, payable Nov. 1 to stockholders of record Oct. 16.

The Illinois Northern Utilities Co. has declared its regular quarterly dividend of 1.5% on the preferred stock, payable Nov. 1 to stockholders of record Oct. 20.

The Brooklyn Edison Co. has declared its regular quarterly stock dividend of $2, payable Nov. 1 to stockholders of record Oct. 16.

The Commonwealth Edison Co. has declared its regular quarterly stock dividend of 2%, payable Nov. 1 to stockholders of record Oct. 15.

The Manufacturers Light & Heat Co. has declared its regular quarterly dividend of 2% on the preferred stock, payable Oct. 15 to stockholders of record Sept. 30.

The Northern States Power Co. has declared its regular quarterly dividend of 1.75% on the preferred stock, payable Oct. 20 to stockholders of record Sept. 30.

The Central Illinois Public Service Co. has declared its regular quarterly dividend of 1.5% on the preferred stock, payable Oct. 15 to stockholders of record Sept. 30.

The Western Power Corp. has declared its regular quarterly dividend of 1.5% on the preferred stock, payable Oct. 15 to stockholders of record Sept. 30.

The American Light & Traction Co. has declared a quarterly dividend of 1% on the common and a stock dividend of 1.75% on the common and the regular quarterly dividend of 1.5% on the preferred, all payable Nov. 1 to stockholders of record Oct. 15. On July 6 a quarterly cash dividend of 1.75% and a stock dividend of 1.75% was declared and previous to that the company had been paying 2.5% in cash and 2.5% in stock quarterly.

The Idaho Power Co. has declared its regular quarterly dividend of 1.75% on the preferred stock, payable Nov. 1 to stockholders of record Oct. 15.

WEEKLY COMPARISONS OF CLOSING-BID PRICES OF SECURITIES OF LEADING ELECTRICAL COMPANIES.

Quotations furnished by F. M. Zeiler & Co., Rookery Bldg., Chicago.

Public Utilities—	Div rate. Per cent.	Bid Oct. 12.	Bid Oct. 19.
Adirondack Electric Power of Glens Falls, common	6	14	14
Adirondack Electric Power of Glens Falls, preferred	6	70	72
American Gas & Electric of New York, common	10+extra	97	113
American Gas & Electric of New York, preferred	6	37	38
American Light & Traction of New York, common	..	110	110
American Light & Traction of New York, preferred	6	82	81
American Power & Light of New York, common	4	45	52
American Power & Light of New York, preferred	6	67	66
American Public Utilities of Grand Rapids, common	..	7	7
American Public Utilities of Grand Rapids, preferred	7	16	21
American Telephone & Telegraph of New York	..	99	100
American Water Works & Elec. of New York, common	..	7	3
Appalachian Power, common	..	3	3
Appalachian Power, preferred	7	15	16
Cities Service of New York, common	+extra	297	298
Cities Service of New York, preferred	6	65½	65½
Commonwealth Edison of Chicago	8	99	100
Comm. Power, Railway & Light of Jackson, common	..	17	17
Comm. Power, Railway & Light of Jackson, preferred	6	39	40
Federal Light & Traction of New York, common	..	7	8
Federal Light & Traction of New York, preferred	..	43	44
Northern States Power of Chicago, common	..	35	38
Northern States Power of Chicago, preferred	ex.div.7	79	79
Pacific Gas & Electric of San Francisco, common	..	49	48
Public Service of Northern Illinois, Chicago, common	7	64	65
Public Service of Northern Illinois, Chicago, preferred	6	85	85
Standard Gas & Electric of Chicago, common	..	15	15
Standard Gas & Electric of Chicago, preferred	8	36	36
Tennessee Railway, Light & Power of Chattanooga, common	..	1½	2
Tennessee Railway, Light & Power of Chattanooga, preferred	6	3½	6
Western Power of San Francisco, common	..	21	21
Western Union Telegraph of New York	extra	89	89
Industrials—			
Electric Storage Battery of Philadelphia, common	4	120	118
General Electric of Schenectady	8	141	140
Westinghouse Electric & Mfg. of Pittsburgh, common	7	49	49